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CONCHOLOGISTS

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The Nautilus.

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NOTES ON SOME FRESH-WATER SHELLS FROM THE YUKON TERRITORY.

BY J. F. WHITEAVES.

Among the zoölogical collections in the Museum of the Geological Survey of Canada, there are a few fresh-water shells from the Yukon Territory, which have not yet been reported upon, though they are by no means devoid of interest to the student of the geographical distribution of the mollusca.

Most of these shells were collected by the late Dr. G. M. Dawson, in 1887, at four localities, viz., from Frances Lake, at the head of the Liard River; from Finlayson Lake, between Frances Lake and the Pally River; at the Lewes River; and from Lake Marsh or "Mud Lake," one of the tributaries of the Lewes River. The remainder were collected by Mr. Joseph Keele in 1904, from the Stewart River, near Mayo River.

The Cycladidæ in these collections have been kindly determined by Dr. V. Sterki, and most of the Gasteropoda by Dr. W. H. Dall. The species represented in them are apparently as follows:

PELECYPODA.

Sphærium Walkeri Sterki.

Frances Lake, one valve; and Finlayson Lake, two perfect specimens. In 1904 Mr. W. McInnes collected a few living shells, which were referred to this species by Dr. Sterki, from the Atta-

wapiskat River, Keewatin. The type of *S. Walkeri* are from Lake Michigan.

Pisidium Idahoense Roper.

Stewart River, near Mayo River; one dead but perfect specimen and an odd valve. Dr. Sterki writes that the "anterior part of the hinge of the former is reversed."

Pisidium compressum Prime.

Stewart River, near Mayo River; one specimen. Mr. McInnes has recently collected specimens of this species at Ozhiski Lake, Attawapiskat River, at Kawinogans River (a branch of the Attawapiskat) and at the Winisk River, Keewatin.

Pisidium variabile Prime, var.

Stewart River, near Mayo River; two specimens. Mr. McInnes has recently collected three specimens on the Kawinogans River, which Dr. Sterki has identified with this species.

Pisidium scutellatum Sterki.

Frances Lake; fry only, one specimen. Dr. Sterki has recognized a few specimens of *P. scutellatum* in collections made by Mr. McInnes last year at Ozhiski Lake and the Kawinogans River, Keewatin.

GASTEROPODA.

Valvata mergella Westerlund.

Stewart River, near Mayo River, two specimens.

Valvata Lewisii Currier.

Valvata sincera of Haldeman, C. B. Adams, Dekay; W. G. Binney, and many subsequent American writers, but, according to Dall, not *V. sincera* of Say.

Valvata striata of Lewis, but not of Philippi.

Frances Lake, ten specimens, and Finlayson Lake, two specimens. Presumably similar specimens were previously recorded by W. G. Binney, in 1865, under the name *V. sincera*, as having been collected by Major Kennicott from the Peace River, Upper Mackenzie, and Great Slave Lake. Frances and Finlayson Lakes both belong to the Upper Mackenzie drainage system.

Elsewhere in Canada, *V. Lewisii*, as recently identified by Dall, is now known to occur at many localities from Gaspé to Alberta, and as far to the northeastward as Fort Chimo, Ungava.

A few specimens, in the museum of the Canadian Survey, which Dall thinks are "probably the true *V. sincera* of Say, or a variety of it," were collected on the island of Anticosti by Professor Macoun in 1884, and on the Attawapiskat and Kawinogans Rivers by Mr. McInnes in 1904. Those from the Kawinogans River have the outer half of the last volution free and partially uncoiled.

Limnæa stagnalis appressa Say.

Stewart River, near Mayo River; two specimens.

Limnæa Randolphii Baker.

Frances Lake, eleven fine and large specimens; Finlayson Lake, eleven specimens, mostly immature; Lewes River, one small specimen; and Lake Marsh, Lewis River, seventeen fine and mostly adult shells.

Limnæa palustris Muller.

Frances Lake, two specimens.

Limnæa Vahlii Beck. (Dall.)

Frances Lake, nine specimens; Finlayson Lake, twelve specimens.

Limnæa arctica Lea. (Dall.)

= *Limnæa Pingeli* Beck, var.; (Dall.)

Stewart River, near Mayo River, two specimens.

Planorbis trivolvis Say.

Stewart River, near Mayo River; seven specimens of a rather large, depressed and thin-shelled form of this species, with the spiral angulation obsolete.

Segmentina armigera (Say).

Stewart River, near Mayo River; one specimen.

Physa sp. indet.

Finlayson Lake; one very immature specimen.

Ottawa, April 5, 1905.

LISTS OF A FEW SPECIES OF LAND AND FRESH-WATER SHELLS FROM THE IMMEDIATE VICINITY OF JAMES BAY, HUDSON BAY.

BY J. F. WHITEAVES.

The shells referred to in the following lists were collected by Messrs. O. O'Sullivan and W. Spreadborough, at three localities near James Bay, on behalf of the Geological Survey of Canada, and are now in its Museum :

1. From two miles above the mouth of the Harricanaw River, Hannah Bay, collected July 1, 1904.

(A. *Land Shells.*)

Cochlicopa lubrica (Muller). Several specimens.
Vitrina limpida Gould. Eight specimens.
Zonitoides arboreus (Say). Two specimens.
Pyramidula striatella (Anthony). Four specimens.
Succinea retusa Lea (*S. ovalis* Gould non Say). Several specimens.

(B. *Fresh-water Shells.*)

Limnæa stagnalis appressa. Ten specimens.
Limnæa Vahlii Beck (teste Dall). Eleven specimens.
Limnæa truncatula Muller (teste Dall). Several specimens.
Bulinus hypnorum (L.). Eight specimens.
Planorbis trivolvis Say. Two specimens.

2. From the mouth of the Moose River, about a mile below Moose Factory, collected July 15, 1904.

Lampsilis luteolus (Lamarck). Two specimens.
Anodonta marginata, Say (= *A. fragilis*, Lamarck). Three specimens.

3. From the mouth of the Albany River, about a mile below Fort Albany, collected July 25, 1904.

Planorbis albus, Muller (= *P. hirsutus*, Gould). Several specimens.

Ottawa, April 8, 1905.

A SECOND CONTRIBUTION TO WEST COAST CONCHOLOGY—I.

BY HENRY HEMPHILL.

This may be considered a continuation of the article published in the three closing numbers of Vol. XIV (1901) of the NAUTILUS, entitled, "A Contribution to West Coast Conchology."

Since the publication of that article I have devoted the greater part of three years or more to further exploration of the islands off the coast of southern California, and a large part of a narrow strip of the mainland directly along the coast opposite to the islands, extending from San Pedro, at the south, to San Simeon Point, at the north, the latter point being about one hundred miles, more or less, north of San Miguel Island, the most northerly island of the group.

The new material secured during this exploration is so variable in every respect and yet so closely connected by intermediate forms, and adds so much to our knowledge, not only of the land shells of this region, but to the subject of variation generally, that I offer the following notes and descriptions for the consideration of those interested in the study of our land shells.

These islands and the narrow strip of the mainland referred to above constitute a very small portion of a large zoölogical province that has its southern line at San Diego, and its northern limits at Juan de Fuca Strait, and which may be or is known as the Californian Province, as most of the forms of molluscan life found within these limits have their metropolis, I believe, within the borders of the State of California. These limits, however, like all other attempts to define boundaries in nature, are more or less arbitrarily drawn, and serve only in a general way for the purposes of study, as dividing lines. Quite a number of genera and species that live in this province pass beyond these limits, while a few from the more northern region and even some circumpolar forms, disguised as species, range across the California Province far down into the more southern regions.

On account of their isolation or separation from the mainland and peculiar conditions in the environment, both the fauna and flora of the islands possess unusual attractions for those interested in the study of the problems of life. I shall go somewhat into the particulars and details of the conditions existing on these islands as I have

seen and observed them, and picture them as best I can for the readers of the NAUTILUS. A bit of history in this connection may be of interest.

Historians and others tell us that these islands after several unsuccessful expeditions were discovered in the year 1852, by Juan Rodrigues Cabrillo, a Portuguese navigator in the service of Spain.

COAST LINE AND ISLANDS OF SOUTHERN CALIFORNIA.

"Cabrillo," Prof. Holder tells us in his very interesting little booklet on Santa Catalina Island, "named the islands we call to-day San Clemente and Santa Catalina after his ships, the former 'La Vittoria' and the latter 'San Salvador.'"

In May, 1602, sixty years later, another expedition under Sebastain Vizcaino visited these islands in the following month of December. Vizcaino ignored Cabrillo's names and renamed them San Clemente and Santa Catalina, under which false names they have been called ever since. According to modern conchological rules, these later names fall into the synonomy of Cabrillo's earlier ones, but it seems a shame to "knock out" one saint's name with another,

if I am allowed to use a pugilistic phrase in connection with such a saintly subject.

Prof. Holder continues to tell us that the historian of Vizcaino was Father Torquemada, a member of the party, who has left a description of a temple on Santa Catalina. "It consisted of a large circular place decorated with feathers, in the centre of which was an idol bearing upon its sides representations of the sun and moon. To this object the natives sacrificed birds, yet when the Spaniards shot the ravens the natives raised many lamentations." "I believe," says Father Torquemada, "that the devil was in those crows, and spoke through them, for they were regarded with great respect and veneration. The birds were so tame that they would snatch fish from the hands of the native women who did not dare to retaliate." Torquemada considered the natives of Santa Catalina a superior race and in advance of the natives of the mainland in every way. The women were attractive, had fine eyes, and were modest and decorous, while the children were described as "white and ruddy."

When Cabrillo discovered Southern California, Santa Catalina had a large and vigorous population. To-day (1901), three hundred and fifty-two years later, this is represented by a pitiful handful of natives who are scattered about the foothills of the missions, by graveyards despoiled, and by the quaint stone implements plowed up by the modern ranchers.

I am indebted to the U. S. Coast Pilot for the following information in regard to the size, distances and elevations on these islands:

"The general trend of these islands is southeast and northwest," or about parallel with the general trend of the coast line of the mainland south of Point Conception, which point is a little north of San Miguel, the most northerly island of the group.

"Santa Catalina lies about 18 miles southward from Point Fermin. It is about 18 miles long in an east and west direction, with a greatest width of about 7 miles. About 6 miles from the western end is a deep cut in a north and south direction that almost severs it (this is known as the isthmus). The highest peak, 2100 feet high, lies about the middle of the island."

In February, 1897, the California Academy of Sciences issued a Bulletin on the Geology of Santa Catalina Island, written by William Sidney Tangier Smith, which goes largely into the details and analysis of the rocks of the island. As the rocks form the basis of all

the clays and soils, and in connection with the internal heat and moisture and external atmospheric conditions, form the basis of all organic life, including man, Mr. Smith's list and arrangement may be desirable to those who take a broad view and are seeking a solution of the great problems of life. His list and arrangement follows:

A—Eruptive Rocks.
1. Diorite.
2. Porphyrite.
3. Rhyolite.
4. Andesite.

B—Tuff and Diatomaceous Earth.
1. Tuff.
2. Shale.

C—Sedimentary Deposits.

D—Breccia.

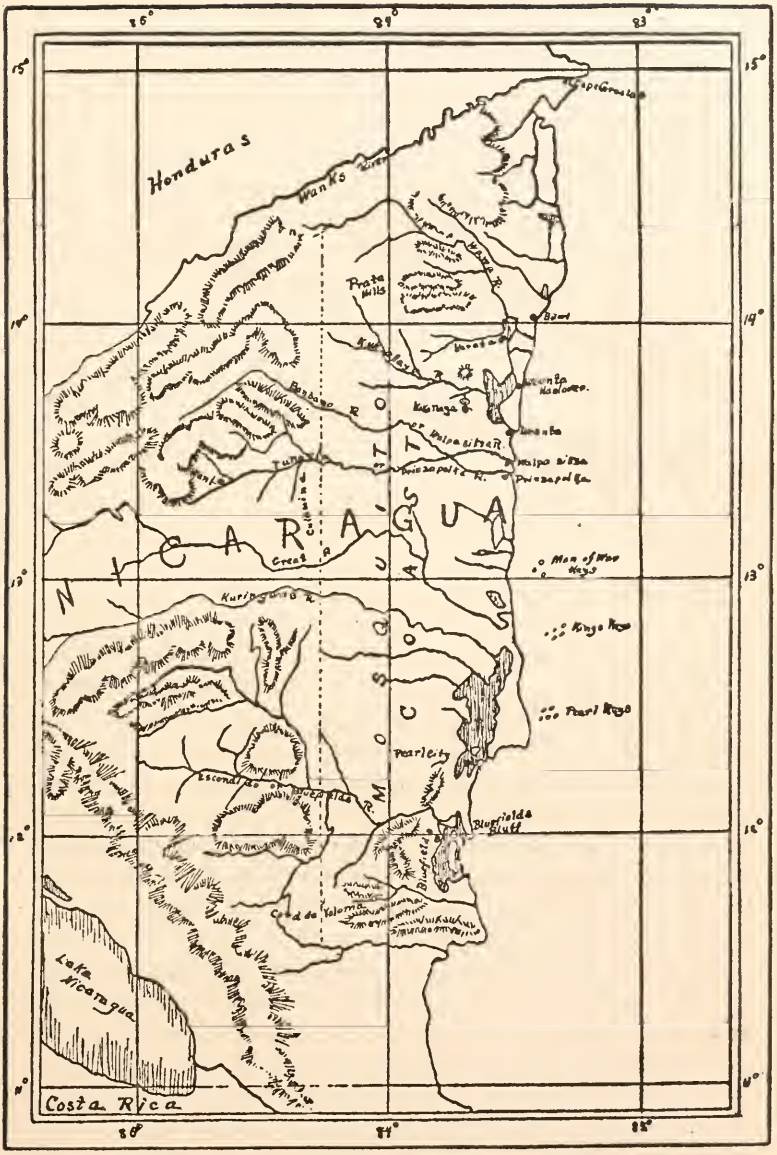
E—Basement Series.
1. Quartzite.
2. Actinolite.
3. Serpentine.
4. Talc Shists.
5. Garnet Amphibolite.

(*To be Continued.*)

SHELL-COLLECTING ON THE MOSQUITO COAST OF NICARAGUA.

That part of the Central American coast stretching from the Caribean Sea inland for about 40 or 50 miles and from the Wawa River and Sisin Creek on the north to the Rama River on the south has, until very recently, been known as the Mosquito Coast. In former times it was one of the regular haunts of those historic gentlemen whose lives have given us some thrilling tales of the old Spanish Main, and who had so much regard for the things of others that they soon became their own. The well-primed flint-lock and the handy machette were sometimes brought into play and made said transfers of property more expeditious.

Bluefields, the metropolis of the Mosquito Coast, with its cosmopolitan, variegated population and babel of tongues, owes its name to Blauveldt, one of those old sea-dogs. From 1655 to 1850 this land enjoyed autonomy under Great Britain, being ruled by native kings. But in 1850 under the terms of the Clayton-Bulwer treaty and of the treaty of Managua of 1860 the suzerainty was transferred to Nicaragua. The Indians enjoyed practical independence under their native king until 1895, when Nicaragua troops took actual possession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Kurinwas R.
Escondido R.
Pearl Keys
Pearl City
Bluefields Bluff
Cabo de Gracias
Lake Nicaragua
Costa Rica
NICARAGUA
MOSQUITO
16°
15°
14°
13°
12°
11°
85°
84°
83°

and the last vestige of native rule disappeared. The United States no doubt welcomed the final act, but England has never yet given full assent to it. The political change has not been beneficial to the native population.

A little gold in the rivers, some exports of mahogany and rubber support a small foreign population, who import considerable foreign food and manufactured goods. All this making the imposition of duty possible, the Nicaraguan government was naturally attracted, for the main function of government in many of our naughty little sister republics is to grab the pennies.

The white people comprise the foreign traders and the missionaries. The Nicaraguans in Bluefields are mostly mixed; as to the rest of the population it is made up of native Indians, except for the West Indian negroes who have settled in Bluefields and at Pearl Lagoon.

Of the Indian tribes the Moskos, whom the Spaniards called Mosquitos, are the most numerous and inhabit the seacoast. On Rama Key, in the Bluefields Lagoon, and on the mainland as far as Monkey Point, live a few hundred Rama Indians. Near Pearl Lagoon and near Wauks River or the Rio Coco dwell some remnants of black Caribs. Near the headwaters of streams west of Bluefields are to be found some Woolwas, while the Sumus inhabit the country along the headwaters of streams to the north of the Kuringwas River. All these interesting tribes and the Sumus especially, the most interesting of them all, are fast dying out or mixing. The ethnologist had better hurry or a field of research will be gone forever.

In Vol. 5, p. 151, of "The American Journal of Conchology," Mr. Ralph Tate, who collected in the Chonatales province, says: "A low mountain chain trends in a northwest and southeast direction through the central part of the country. . . . This region *extends to the Atlantic seaboard.*" The italics are mine, and it is to this latter remark I want to call attention, for I have had inquiries from conchologists concerning shells they thought lived on the Mosquito Coast which could not possibly have existed in its swamps.

With the exception of the low, isolated Pratta Hills to the northwest of Karata, a single isolated cone, known as Lappan, just west of Wounta Haulover; a solitary ridge near Pearl Lagoon, and some spurs of Cord. de Yoloma south of Bluefields, the entire Mosquito

Coast, together with much of the country beyond its limits, especially up the Kuringwas and the Avultara (Rio Grande) is low, swampy, savanna land. For twenty miles back from the sea, except in the rainy season, the rivers, creeks and lakes are salty. A glance at the map will show that the sea has invaded the land along the whole coast. The Indians say the coast is settling. Trees planted 80 years ago, high and dry and back from the sea, were at the high-tide line, being washed away in 1903. Lagoons once separated by a strip of forest or connected by a very narrow tingui (channel) are now united as one. Banks that once sloped to the water's edge are now being submerged.

Dense forest covers the country along all the streams and lagoons. Near the sea is the ubiquitous mangrove. Between the rivers are large savannas on which roam the cattle of the Indians, as well as deer. With few exceptions, the villages are along the rivers and lagoons, and consist of wattled and thatched huts. The entire population cannot exceed 15,000. The country is a paradise for naturalists, although I never met any there. It *abounds* in insects, birds, fish and interesting quadrupeds, such as tapirs, peccary, jaguars, pumas and ocelots, besides lizards, alligators, turtles and manatees. I also observed at least three kinds of monkeys. Last, and of course not least, there are molluscs.

Along the seashore the country is sandy, and one is reminded of the Jersey beach. There are, however, three isolated spots on the coast which form exceptions. At the entrance to the harbor at Bluefields there is a strong "Bluff" standing high above the surrounding low stretches of country. At Walfa Siksa, the meaning of which is black stone, are to be found on the north side of the river mouth some black igneous rocks. They are also found under the river bed and crop out back of the village, which stands back from the sea, on the south bank of the river. This outcrop forms quite a conical knoll of rocks, having remarkable, square-like cavity structures. It is hidden in the "bush," and few white men know that the hill exists. To the north of the Wawa river there are some high banks of clay and stones along the sea, and the place is known as Bragman's Bluff.

The sand of the sea-beach extends back only a short distance—from a few feet to a few hundred yards, where clay and igneous-looking earth takes its place. Back twenty or thirty miles the river

banks get high enough to prevent overflow, and then the country begins to be stony. Rapids and falls are found on nearly all the rivers along the western border of the old reserve, and doubtless indicate an ancient seacoast.

From the shore line seaward there extends a very gradually sloping continental shelf, making shallow water and calm seas.

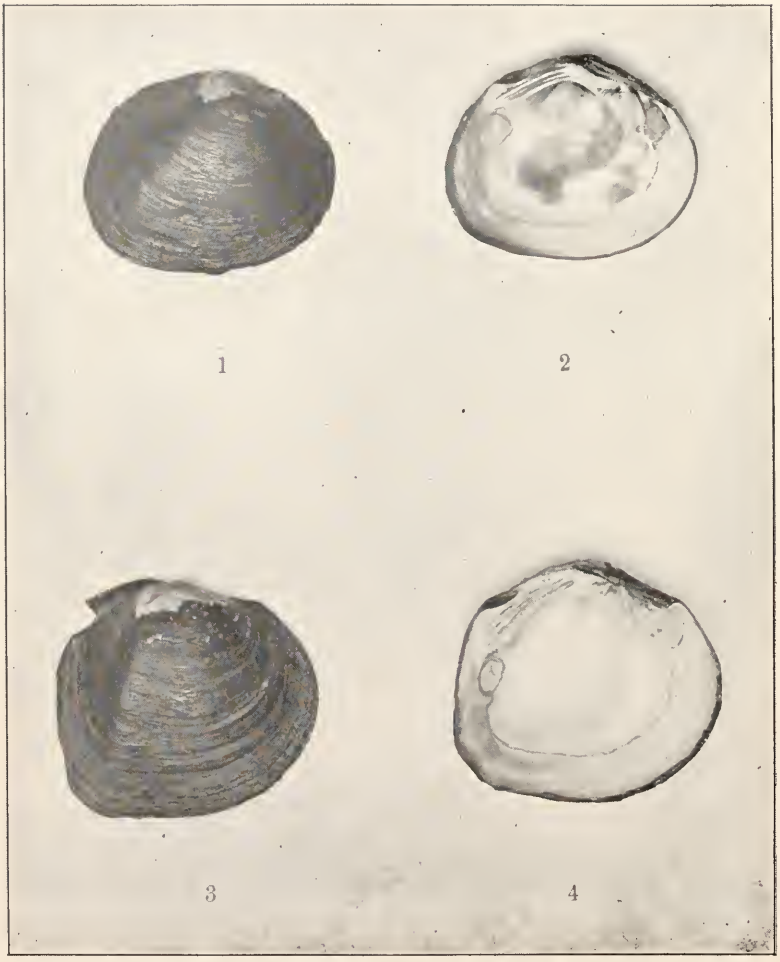
From three to forty miles out there are keys of various sizes, the largest being (Great) Corn Island. Some are treeless, while others are covered with mangroves and cocoanut palms.

From 1899 to 1903 it was my privilege to live at Wounta Haulover, a little Indian village of wattled and thatched huts. Being the only white man within twenty miles in any direction, loneliness sometimes drove me out into the forest, along the rivers or down by the sea—to collect shells. Although my time was fully occupied with professional duties, I succeeded in getting together a nice cabinet of specimens. In another paper I shall name them and append some notes.

NOTES.

Cypræa xanthodon Gray.—Dr. T. H. May, Government Health and Medical Officer of the Port of Bundaberg, Queensland, Australia, has sent me three beautiful specimens of *Cypræa xanthodon* Gray, which he says his children picked up last Christmas when at his seaside cottage. The shells were alive when taken and were found under rocks at low water. This species has been supposed to have a deep-water habitat.—S. Raymond Roberts.

Wholesale Pearl Fishing.—A great pearl fishery will take place at Marichchikkaddi, in the Island of Ceylon, on or about February 20, 1905. The banks to be fished are the southwest Cheval Paar, which is estimated to contain 3,500,000 oysters, sufficient to employ 200 boats for two days; the mid-east Cheval Paar, estimated to contain 13,750,000 oysters, sufficient to employ 200 boats for seven days; the north and south Moderagam, with 25,700,000 oysters, sufficient to employ 200 boats for thirteen days; the south Cheval Paar, estimated to contain 40,220,000 oysters, sufficient to employ 200 boats for twenty days, each boat being fully manned with divers.—*London Globe.*



FRIERSON: NEW UNIONIDÆ.

The Nautilus.

Vol. XIX. JUNE, 1905. No. 2.

NEW UNIONIDÆ FROM ALABAMA.

BY L. S. FRIERSON.

Quadrula archeri n. sp. Plate I, figs. 1, 2.

Shell small, thin, lenticular, somewhat quadrate, smooth. Anterior margin rounded, basal margin slightly curved, dorsal margin somewhat bent midway, posterior margin rounded or bluntly pointed, umbones low and flattened. Sides compressed, raised slightly at the posterior angle, which is nearly obsolete; posterior slope wide, and somewhat elevated; epidermis smooth, light brown, sometimes inclining to orange, two or three concentric bands of green or black mark the earlier lines of growth.

Teeth of the left valve double, anterior cardinal high, thin and wedge-shaped, the posterior cardinal triangular, low and small, laterals thin, rather short and nearly straight.

In the right valve the cardinals are divided by a deep cleft, extending nearly to the bottom of the anterior adductor scar, the posterior tooth being much the smaller. The dorsal plate is quite wide for so small a shell. The shell cavity is quite capacious; the beak cavities deep and compressed. Nacre white, with brown splotches, and very iridescent. The nacre is probably also salmon-colored in some individuals. The pallial line in the specimens before me is nearly imperceptible in the posterior part of shell, where the nacre is *very thin.* One specimen shows in the upper part of the shell cavity, 20 or 30 almost microscopic muscle-scars extending from the beak cavities half way to the pallial line. Long. 34, alt. 28, diam. 14 mm. Habitat: Tallapoosa River, at Tallassee, Ala.

This shell is not closely allied to any shell with which I am acquainted. On the one hand it resembles some of the *Pleurobemas* of the group typified by *P. fassinans*, Lea, and on the other hand it bears some resemblance to a young and thin *Q. aurea*, Lea. In the concentric coloring of the lines of growth, it reminds one of *Q. asperata*, Lea. Its deep and compressed beak cavities place it in the genus *Quadrula*, while its resemblances to the latter two species is too slight to cause any error in their direction. Four specimens were found in the Tallapoosa River, Ala., by Mr. A. A. Hinkley, who has kindly allowed me to retain the specimen figured.

Quadrula rubidula n. sp. Plate I, figs. 3. 4.

Shell small, heavy, somewhat triangular; base emarginate, dorsum arched, posterior angle biangulate; ligament elevated, light red. Beaks not very high, umbones inflated, sides flattened, epidermis brown, rough, obsoletely rayed, and showing traces of a greenish tint.

Cardinals stout, short, rough, inclined to be double in both valves; laterals rather short, heavy, rough, and slightly curved; cavity of shell very irregular, excavated from beak to posterior margin; beak cavity deep and compressed, nacre white, sometimes pinkish, not very iridescent. Long. 36, alt. 32, diam. 22 mm.

The shell is close to *Q. rubida*, Lea, and some forms resemble some of the depauperated specimens of *Q. trigona*, Lea. From either of these species it may be differentiated by its small size, and by the biangulated posterior angle. Some 30 or 40 specimens from the Mulberry River; 20 or 30 from the Black Warrior, and a single specimen from the North River, Alabama, show a remarkable constancy in size and other characters. Examples may be seen in the cabinets of most of the collectors of Unionidæ in America, contributed by Mr. A. A. Hinkley, of Dubois, Illinois.

TWO UNDESCRIBED CALIFORNIAN SHELLS.

BY WILLIAM HEALEY DALL.

Murex (*Phyllonotus*) *santarosana* n. sp.

Shell small for the subgenus, with about six whorls, each bearing from five to seven strong, low, reflexed varices, with a prominent,

short, reflexed and inflexed grooved spine at the shoulder of the whorl; nuclear whorls one-and-a-half, smooth, minute; nepionic whorls two-and-a-half, with the whorls tabulate, two strong spiral cords at the shoulder, the varices thin, irregular laminæ low and obscure; subsequent whorls, with five (increasing in the adult to seven) strong, anteriorly crispate, amber-brown varices, under which the whorls are tabulate, the intervarical spaces whitish, nearly smooth or with very obscure revolving lines or threads; base of the whorls somewhat constricted with a short grooved spine on each varix where it crosses the concavity; aperture obovate, small, with the inner lip smooth, the outer one more or less denticulate on the edge, the enamel whitish; canal long, anteriorly attenuated, the margins adjacent but not adherent. Height of adult 45.0; max. diameter 28.0; max. diameter of aperture 10.5 mm.

Types, U. S. Nat. Museum, 130628 and 133945.

Dredged by U. S. F. C. Str. Albatross off Santa Rosa Island, in 82 fathoms sand, also found off San Pedro and Catalina Island by various collectors.

Specimens were named and distributed in 1895, but by some inadvertence the descriptions, both of this and the following species, seem to have remained unpublished.

Alaba oldroydi n. sp.

Shell small, polished, pale rufescent brown, with seven whorls, the protoconch smooth, swollen, globose, the following whorl smooth and rather inflated, the subsequent whorls sharply spirally grooved with wider interspaces, crossed especially the earlier ones with a few irregular, low, half obsolete wrinkles, the whorls are flattish and sometimes slightly constricted in front of the suture; the aperture patulous, recalling that of *Rissoina*, the base rounded with no umbilicus. Length 5.25; max. diam. 2.0; length of last whorl 2.5 mm.

Type, U. S. Nat. Mus., No. 158,771. San Pedro, 10 fathoms. Collected by Mrs. Oldroyd, Mr. Roper, Mr. Lowe, and others near San Pedro.

None of the specimens retain the operculum. The form of the shell, and especially of the aperture, recalls *Rissoina*, but the irregular varices, sculpture and apex are more like *Alaba*. A certain amount of doubt as to its true zoological position must remain until the operculum is known.

SHELL-COLLECTING ON THE MOSQUITO COAST OF NICARAGUA—II.

BY W. H. FLUCK.

I wish to acknowledge my indebtedness to several naturalists who have helped me in naming and verifying my shells, especially Messrs. Pilsbry, Johnson, Dall, Schick, Shackleford, Hodgson and Ancey. Without their generous help a solitary student like myself would be like the old woman who lived in the shoe, with one difference, trouble about shells, not children.

The localities mentioned in this and in subsequent papers may be found by referring to my map, page 9 of this volume. The names are somewhat blurred owing to rough paper and the reduction of the drawing, but it answers the principal reason for its publication, the location of Wounta Haulover, Wounta, Walfa Siksa, the Keys and Wani.

Spirula peronii Lam.

Wounta Haulover, and everywhere along the coast. No living specimens were found, but perfect shells of this cephalopod, immaculate and beautiful, were taken in quantity. I nearly always found it on the upper reaches of the beach among the dead algae and trash cast up by the sea.

Murex brevifrons Lam.

Wounta Haulover. A specimen is found now and again on the beach, but the shell is not plentiful.

Murex bellus Rve.

Same locality. One dead but perfect shell.

Sistrum nodulosum C. B. Ads.

King's Keys. One shell.

Purpura trinitatensis Guppy.

Man of War Keys.

Cymatium pileare Lam.

Walfa Siksa. On the rocks and sand reaches at this place there is good collecting, especially for bivalves.

Purpura floridana Con.

This is the shell known as *P. hæmastoma* L., var. *floridana* Con. Dr. Dall considers *floridana* of specific value. My shells are very variable in form and marking. Some are smooth-whorled and the color of beach sand; others are studded with one or two rows of

more or less prominent processes, especially on the body whorls, and are more marked than the smooth variety. Found on the beach on logs that were a-wash at high tide. In the dry season, when little fresh water from the Walpa Siksa river enters the sea, these shells are sometimes found on the rocks near the Indian village of the same name nearby.

Purpura patula L.

King's Keys. Man of War Keys. Up to 3 inches long and very beautiful. In the larger specimens the processes and other sculpture are often more or less obliterated. An old and reliable Indian told me that in former times the natives made dye for their loin-cloths—the name of which in their tongue is *palpura*, strange to say—out of molluscs from the keys.

Fasciolaria tulipa L.

Man of War Keys, and abundant on all the others as well, where they are sought after by the natives as an article of food.

Drillia fuscescens Gray.

A single dead shell at Wounta Haulover.

Drillia sp.

Dr. Dall says this is near *D. harfordiana* Rve., perhaps a variety of it. King's Keys.

Latirus cinguliferus Lam.

Man of War Keys.

Melongena melongena L.

Man of War Keys. Also on rocks at Walpa Siksa alive, as well as hundreds of dead shells as hermit-crab houses in the shallow water inside the bar.

Phos? d'orbignyi Payr.

King's Keys. Two specimens.

Pisania pusio L.

Man of War Keys. Numerous. I got eight specimens.

Nassa vibex Say.

Wounta Haulover, and everywhere, in favorable places. In the quiet September sea, when the beach is low, it can be found alive or containing hermit crabs.

Voluta virescens Sol.

In four years I found only four dead shells at Wounta Haulover.

Marginella apicina Mke.

Wounta Haulover. In September and March, especially in the former month, the N. E. trade wind dies away entirely, and instead, the wind blows from the S. or S. E. across South America. By the time it reaches the Caribbean it is the gentlest of zephyrs. The sea becomes as blue as the sky and as calm as a mill-pond on a hot August day. Under such conditions the shallow sea along the shore swarms with small forms of mollusca, and the littoral and laminarian collector is enabled to get forms not obtainable at any other time except by dredging. *M. apicina* is found at this time in quantity.

Marginella guttata Dillw.

Also found at the same place and under similar conditions, but is not as plentiful as the former.

Oliva (*Agaronia*) *testacea* Lam.

This little mollusk seems to be absolutely at home in the sand at the bottom of the shallow sea at Wounta Haulover. I think I am safe in saying that this is the commonest *laminarian* univalve on the Caribbean coast of Nicaragua. It is rarely cast up dead. I have taken them alive in quantity whenever the sea was calm enough to feel for them. With the Indian boys of my village I had a standing bargain to purchase all the small forms they brought me. That was before I found my first Olive. I was in bathing one day, when my foot, which soon became a good sub-marine shell-collector, accidently touched something that got away. I went for it quicker than it takes to write about it, and soon landed my first Olive. It was a prize I was proud of. I schemed out a little plan to get more, and confidentially let my house-boy in on the ground floor. I agreed to pay him 5 cents (silver) for every similar shell. He smiled hopefully, but still I was not suspicious. My hope was to get two or three sets for my friends. The boy soon disappeared, and quietly marshalled the boys of the village, who immediately invaded the sea. In less than an hour this little army confronted me with double handfuls of these Olives. They enjoyed their corner in the Olive market, and began unloading on me at 5 cents per. They allowed me, after an explanation, to make a selection of several dozen at less money. The rest went back into the sea. I kept a few alive in a jar of water and sand for a long time. My observations were of little interest, as the molluscs burrowed in the sand, and seemed to want to go deeper. The foot is large and violet-colored, and with it they dig rapidly.

Columbella mercatoria L.

A few shells from Man of War Keys. On the mainland nothing but fragments were ever found.

Columbella (*Anachis*) *varia* Sowb.

Columbella (*Anachis*) *lyrata* Sowb.

Both these forms can be found in large quantities at Wounta Haulover, but always, so far as I remember, as hermit-crab shell. I do not recall ever getting any alive, possibly because I never dredged for them. Every September, for 4 years, my boys and I collected hundreds of them. There is no doubt in my mind that both forms can be had alive not far from the Wounta Haulover beach. If I had known at the time that this was a new locality for *C. varia*, I would have made an effort to secure living specimens.

Engina turbinella Kiener.

Man of War Keys. Two specimens.

Cancellaria reticulata L. Wounta Haulover.

Have also seen it from the keys.

Terebra cinerea Gmel. Wounta Haulover.

Abundant, especially in September, when the sea is calm. At such times it seems to burrow nearer the surface of the sand. It is easily kept in a jar of sea-water and is quite active. Those I had in confinement spent much time creeping about on the sides of the jar like *Limnæas*, displaying their round, disk-like foot.

Terebra hastata Gmel. Same locality.

Rare. Only 3 specimens in 4 years. It probably inhabits deeper water than *T. cinerea.*

(*To be Continued.*)

A SECOND CONTRIBUTION TO WEST COAST CONCHOLOGY—II.

BY HENRY HEMPHILL.*

I have seen it stated several times by writers on conchology, that in regions where limestone predominates in the geological formation, and consequently becomes the principal element of the soil, that snail shells were or are more abundant (and hence a greater amount

* By typographical error the date of discovery of the islands was given as 1852 on p. 6 of last number, 5th line from top. It should read 1542.

of that form of organic life exists) than in regions where limestone was absent.

I am not prepared to confirm or deny such statements, for I have found land shells, both large and small, white and almost black, banded and bandless, with all the intermediate states and conditions, abundant and rare in limestone regions, and equally as abundant, rare and variable where limestone was apparently absent. There is undoubtedly a very close relationship between organic life, its form, and the elements composing the soil, which all creatures eat as food in a more refined state, and the elements composing the atmosphere that we breathe into our lungs and blood and which becomes a part of our body and being, and both of which are absolutely necessary to the existence of all forms of life, including man.

I think, therefore, we must seek for a solution of the problem of the origin of organic life, and the great diversity of form and action it presents for our study and consideration, in the chemical combination of the elements, for it is certainly true as Tyndall tells us, that "all matter is alive." In fact matter is the home of life, it is found nowhere else. Both are necessary to a demonstration of any kind, inseparable and truly immortal twins.

In his Essay on Man, the greatest of all philosophical poems, Pope expresses this thought in these inspired words:

> "See matter next with various life endued,
> Press to one centre still the general good.
> See dying vegetables life sustain;
> See life dissolving vegetate again:
> All forms that perish other forms supply
> (By turns we catch the vital breath and die).
> Like bubbles on the sea of matter born,
> They rise, they break, and to that sea return.
> Nothing is foreign; parts relate to whole.
> One all-extending, all-preserving soul
> Connects each being the greatest with the least.
> Made beast in aid of man, and man of beast,
> All served, all serving, nothing stands alone.
> The chain holds good where it ends unknown."

For all of the above reasons Mr. Smith's arrangement and analysis of the rocks of Santa Catalina Island, as given in our preceding paper, may be useful to those interested in this phase of the study of life.

The topography of Santa Catalina Island is bold and rugged. In many or most places the bluffs rise abruptly out of the sea in perpendicular masses several hundred feet in height; occasionally they are lower and assume the form of wall-like buttresses or small rounded headlands jutting out more or less into the sea, back of which the land rises in steep, abrupt elevations more or less broken, to the general level of the main bluff. The summits of the bluffs are sometimes jagged and rough, occasionally rounded off more or less smooth or level, intersected by small gulches, and a few deep canyons. The surface of the interior back of the bluffs gradually rises and is diversified as all mountainous regions are, and stretches off to the foot of "Black Jack," a cone with its peak 2,000 feet high, and "Orizaba" or "Brush Mt.," ridge-like in form with its highest elevation 2,100 feet above the level of the sea. These two peaks are the highest on the island, and are located about its centre. They are a mile or more apart and stand dome-like on the main ridge, which has an average elevation above the sea of about 1,400 feet.

The main canyons, which are few in number, are narrow and deep. The beds of these great washouts rise but a few feet above sea level for a mile or two inland, where they divide into smaller gulches that rise rapidly into and drain the higher slopes of the main ridge or backbone of the island.

At the mouth of Silver Canyon, which is really the only washout I saw on the island worthy of the name canyon, there is an immense and grand bluff of volcanic rock that rises perpendicular to almost or quite the level of the main ridge of the island, and crowds the mouth of the canyon into a narrow gorge but a few feet in width, forming a grand mass of "lava flow" for study and contemplation. This canyon is located on the south side of the main ridge about 7 miles from Avalon. The bluff stands on the east side of the canyon, extends a short distance inland, where it becomes broken into steep rocky declivities and abrupt slopes, covered with a thin coating of soil, and overrun by scrubby bushes, cactus and other plants, all mingled together in wild confusion, barring out in most places the foot of man. The smaller or side gulches that drain into and intersect the main canyons are numerous, generally short, and sometimes quite deep and canyon-like, with steep sides, and separated by sharp, narrow, barren, rocky ridges that run off in every direction like the arms of an octopus, joining the main ridge higher up and near the

middle of the island. On these rocky ridges, which are generally free from brush and chaparral, one may find rough trails, or get along by some rough climbing in his search for specimens, if he has a pair of stout legs and strong hob-nailed brogans under him. The only wild creatures that inhabit these islands to-day, so far as my knowledge goes, are wild goats (introduced with sheep), wild hogs (introduced and found to-day only on Santa Cruz and Santa Rosa Islands), foxes, mice, birds, lizards, snakes (rare), snails and insects. I have no evidence to show that any other animals except the Indians ever did inhabit them; but there are reports of the discovery of the bones of some large creature on Santa Rosa Island some years ago by Dr. Yates.

The northern and more shaded slopes of these island ridges are for the most part covered with scrub-oak bushes and other chaparral of various kinds, their branches low and reaching the ground, the twigs interwoven in many places so that all travel through this tangled wildwood is shut out except an occasional place where the sheep and goats have browsed off the lower twigs and made narrow openings or rough trails in their search for food during the dry season, or in seeking cool, shady retreats during hot summer days. Cacti have nearly full possession of the south and sunny slopes or exposures of the ridges on the island, and here on Santa Catalina, so far as my experience goes, is the breeding ground and home of the various kinds of snails, while the north and more shaded slopes are destitute or deserted by these children of the mist.

Notwithstanding the thin, scanty soil in most places on the steep slopes and narrow rocky ridges, the cactus secures a tolerably firm hold by sending strong, wiry roots down into the cracks and crevices of the bedrock, and in spite of the long dry weather during the summer they succeed wonderfully in developing their stout, succulent and curious forms.

Sometimes these plants are isolated, but generally they grow in dense patches and frequently take full possession of ridge, hill and slope where they stand in great masses, and apparently the more crowded they are the larger and stouter they grow, and armed as they are, with long, sharp thorns and thousands of fine needle-like "pointers" barbed to the end, one must work among them in his search for specimens with great care, otherwise he may receive some painful stabs and wounds which I have frequently met with in my

eagerness to secure some prize that imagined it was safe when within a "crown of thorns."

A few of the main creeks and sluiceways are shallow, broad and open, and cannot be classed as canyons. Their creek-beds are sometimes bordered by small, narrow flats or slopes, with a background of smooth rolling hills and sunny declivities that become more abrupt, rocky and broken as they rise and join the main ridge. On some of these little flats, directly along the banks of the creek, there are occasional patches of small willows, intermingled with bushes and shrubs of various kinds. On the southern sides of these open creeks or sluiceways the land generally rises more abrupt and rapidly than on the opposite side, is more rugged and is densely clothed with the impenetrable chaparral, mingled frequently with cactus, and presenting rather a strange contrast to the barren, treeless and shrubless slopes on the opposite side of the creeks.

The aspect of these islands during the dry season is dreary enough, and yet, even then, there is a sort of melancholy charm about the scenery, especially to those who want to see and study old mother nature in all her moods, which are about as changeable and fickle as her greatest offspring, the genus Homo.

The brown and sere vegetation, the barren and dried-up soil, ridge and slope strewn with fragments of disintegrating ledges of vari-colored rocks, the dumb waterless streams that sing no song and produce no "speckled beauties" to the great disgust of the enthusiastic "fly-throwers," and the hazy atmosphere that frequently hangs like a veil over hill and mountain, and lends a dim, distant and dreamy appearance to the landscape, are conditions not calculated to excite our enthusiasm, and leaves the imagination about as barren of glow as the landscape is of flowers and green grass. With the advent of the wet or rainy season however, all this dreariness is changed and so quickly that one wonders at the sudden transformation of the landscape from a dreary desert waste to a beautiful blooming garden wrought by the magic chemistry of the rains and dews upon the dry, warm earth.

Perhaps in no other part of our blessed republic is there so sudden and rapid a transition in the growth of vegetation, and hence in the general aspect of the landscape, as occurs in Southern California, after the heavy rains fall and the ground becomes well saturated with moisture. I know of no better fact that illustrates so well the

effect of conditions in the environment, not only on vegetable but on all other forms of life as the application of moisture to the warm dry soil, and I may add right here, that in my opinion the proportions of heat and moisture, especially in the early stages of growth of an organism, is probably the most fruitful source of variation.

The rains of Southern California appear to be brewed in the south, at least they are brought here on the wings of the south wind. When the rains are excessive, the gulches, creeks and canyons on these islands become raging torrents; the thin soil in many places, and especially on the south slopes which receive the full force of the storms, becomes filled with water to the bedrock; then landslides more or less extensive occur, when rock, land and cactus are launched into the raging waters and carried out to sea.

With these destructive occurrences whole colonies of snails are frequently carried away and destroyed, except occasionally a few fortunate individuals that may become stranded with other débris lower down on the sides of the creek or canyon, where if the conditions are favorable a new colony will spring up with such modificationt of the creature and the shell as the combination of the already organized creature and the new conditions in the environment determine.

(*To be Continued.*)

PUBLICATIONS RECEIVED.

The Fossil Land Shells of Bermuda. By Addison Gulick (Proc. Acad. Nat. Sci., Phila., 1904, pp. 406–425, plate 36). The shells collected by the author from quarries of the æolian limestone of Bermuda are described and discussed in this valuable paper. Of 17 species of land snails found fossil, 14 are probably peculiar to Bermuda. The recent fauna contains 13 indigenous species, 6 of them peculiar to the island. The most notable of the fossils discovered by Mr. Gulick are new species of *Pœcilozonites*, *Euconulus*, *Zonitoides*, *Vertigo* (2 species), *Carychium* and a *Strobilops* referred to *hubbardi*. "Dr. Pilsbry's conclusion, from the anatomy of *Pœcilozonites*, that the oldest importations to Bermuda came from continental America, is thus confirmed by a large majority of the fossil forms." Some of the commonest species in the modern fauna are wanting in the fossil deposits, such as *Polygyra microdonta* and *Helicina convexa*. Mr. Gulick gives an interesting discussion of the condition of the island at the time the extinct forms flourished, too long for abstract here.—H. A. P.

The Nautilus.

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POLYGYRA DECEPTA N. SP.

BY GEORGE H. CLAPP.

While collecting at Blount Springs, Ala., in July, 1904, Mr. Herbert N. Smith gathered a good series of shells which, at first glance, appeared to be *Polygyra hirsuta*, but careful examination showed two species, a small form of typical *hirsuta*, gr. diam. 7, lesser $6\frac{1}{4}$, alt. $4\frac{1}{2}$ mm., and the above-named new species, in the proportion of about 1 of the former to 7 of the latter.

P. decepta n. sp. *P. hirsuta* Say.

By comparison with *hirsuta* the following differences will be noted: Lip broader and more rounded at the top so that when the shell is viewed from below, the body-whorl joins it in a regular curve instead of forming an obtuse angle; parietal tooth hooked at the outer end and curving into the aperture, the lip being deeply recessed around it; lip-notch narrow and sinuous with a well raised margin which projects above the level of the parietal tooth; width

of aperture, measured from back of lip to edge of parietal callous across the lip-notch, more than half the length, while in *hirsuta* it is less; parietal tooth not quite joining lip at basal margin; internal tubercle short and *completely covered* by the lip so that it is not visible through the base of the shell. The parietal tooth is connected to the end of the lip by a slight buttress and there is a well developed tooth-like process on the lip, but these characters are common to most of the species of this group. Color and hairs about the same as in *hirsuta*.

The outline figures bring out the differences better than the description, *decepta* being drawn from the type and *hirsuta* from a Blount Springs shell.

Type: Greater diam. 7, lesser $6\frac{1}{2}$, alt. $4\frac{3}{4}$ mm., whorls 5.

Greater diam. $6\frac{1}{4}$, lesser $5\frac{3}{4}$, alt. $4\frac{1}{2}$ mm., whorls $4\frac{2}{3}$.

These measurements show the extreme variation in size.

Type No. 5223 of my collection and cotypes in the collections of the Academy of Natural Sciences, Bryant Walker and T. H. Aldrich.

In the character and shape of the lip-notch this species bears a strong resemblance to *P. pilula* Pils. but differs in other important points.

NOTE ON A VARIETY OF CREPIDULA NIVEA C. B. ADAMS, FROM SAN PEDRO, CALIFORNIA.

BY W. H. DALL.

I have recently received from several Pacific coast correspondents a curious form of *Crepidula nivea* C. B. Adams, the form which on that coast takes the place in the fauna occupied by *C. plana* Say, on the Atlantic shores, and usually occupies a situs on the interior of dead, univalve shells, especially such forms as *Lunatia;* but is sometimes found between dead, but still paired, bivalves, or in the borings of *Lithophaga* or *Pholas*. It has as many forms as the *loci* have differences, but, in general, is externally flat or concave and more or less lamellose, of a white color, and elongate-oval shape.

The specimens referred to, however, broke all records by being uniformly straight, convex, smooth, equilateral, white and posteriorly attenuated. It was obvious that the uniformity was due to some special *situs*, but what it was I could not imagine. The other day

Mrs. W. H. Eshnaur satisfied our curiosity and excited our surprise by sending several of these shells *in situ*, and, of all places, on the valves of *Glottidia albida* Hinds! The latter were well grown, and the *Crepidula* exactly covered the outside of the valve, some specimens having a *Crepidula* on both valves, others only on one.

It is well known that the brachiopod in question burrows in the sand; a mucus which exudes from it consolidates the adjacent sand into a sort of tube, from which the distal margins of the valves protrude a little. Hence the *Crepidula* could satisfy its instinct for being on the inside of things, yet not out of reach of food, and the brachiopod was supplied gratis with a well-fitting cuirass or accessory armor, both benefiting. This peculiar-looking *Crepidula* might appropriately take the mutational name of *glottidiarum*, in case one wishes to refer to it briefly. It forms a striking instance of the way in which form is dependent in this genus on *situs*, a subject somebody would find it profitable to work up.

NOTES ON A COLLECTION OF SHELLS FROM BASS LAKE, INDIANA.

BY FRANK COLLINS BAKER.

Some months ago my assistant, Mr. Frank M. Woodruff, made a small collection of shells at Bass Lake, Indiana, which seems of interest enough to list. Bass Lake is a beautiful sheet of water, the clear, crystal depths of which teem with fish and mollusks. The specimens are particularly large and fine.

Anodonta grandis Say. The specimens obtained are the form called *salmonia* by Lea. As stated by Simpson, this form is nearly always blistered and scaly. The salmon color is very beautiful in some specimens.

Anodonta grandis var. *footiana* Lea.

Sphærium occidentale.

Calyculina truncata.

Pisidium abditum Haldeman.

Vivipara contectoides Binney. The individuals from this locality vary from uncolored to distinctly four-banded, and are notably large and fine.

Amnicola limosa Say.

Amnicola limosa var. *parva* Lea.

Goniobasis livescens Menke.

Physa heterostropha Say. The individuals are smooth and highly polished, and are destitute of impressed spiral lines. One specimen is a scalariform monstrosity.

Physa integra Haldeman. Rare.

Lymnæa desidiosa Say. Many zebra-like forms.

Planorbis trivolvis Say.

Planorbis bicarinatus Say.

Planorbis parvus Say.

Segmentina armigera Say.

Note on Valvata.

A collection of *Valvatæ* from Long Lake, Lake County, Illinois, recently received, is of some interest, especially as regards the relative numbers of individuals.

Valvata tricarinata 107.

Valvata tricarinata confusa 6.

Valvata bicarinata 1.

Valvata bicarinata normalis 33.

A NEW SPECIES OF SUCCINEA.

BY HENRY A. PILSBRY.

Succinea indiana n. sp.

Shell obesely ovate, thin, brownish-amber or raw sienna colored, the apex reddish. Sculpture of fine growth-lines and wrinkles, becoming rather coarse wrinkles on the last half whorl. Whorls $3\frac{1}{2}$, very convex, the last large and inflated. Aperture large, oblique, the outer lip either regularly arcuate or somewhat flattened in the middle. Columella thin and strongly arcuate throughout.

Length 11, diam. 7, length of aperture 7.7 mm.

Length 10.7, diam. 6.9, length of aperture 7.7 mm.

Length 10, diam. 6, length of aperture 7 mm.

New Harmony, Posey Co., Indiana; cotypes in collections A. N. S. P., the State Museum at Indianapolis, and L. E. Daniels; collected by L. E. Daniels.

This species seems to be closely related by the obese shape to *S. campestris* of Georgia and Florida and *S. unicolor* Tryon of New

Orleans. It differs from both in color and texture. *S. grosvenori* Lea (of which *S. greeri* Tryon is a synonym) has a longer spire and smaller last whorl.

While it seems strange that a new *Succinea* should be found in so well known a district of the middle west, yet I am unable to identify the form found by Mr. Daniels with any described species.

It was found in 1904 just south of New Harmony on the hillside facing the west between the marl cliffs and the highway.

ON SOME NEW VARIETIES OF CYPRAEA.

BY SLOMAN ROUS.

Cypræa miliaris var. *Brookei* n. var.

Dorsal surface light yellowish-brown with a subquadrate patch of a shade darker color, sprinkled with very faint, scarcely perceptible spots of lighter color, base and extremities pure, shining white, columella tinged with same color but lighter than dorsal surface. Long. 29, lat. 17.3, height 14.5 mm. Philippines.

This beautiful little shell is in the collection of Mrs. J. M. Brooke, of Lexington, Va., who received it from a friend in Cebu, P. I.

Cypræa capensis var. *Elizabethensis* n. var.

Rather wider and higher in proportion to its length than is usual in normal *capensis*, with the irregular brown patch so often found in this species, but with the dorsal line (which in *C. capensis* is usually very indistinct and often invisible, being crossed by the liræ) very broad, distinct and smooth. The liræ on the outer side of the shell are painted with the same color as the dorsal patch. Length 29, width 18.2, height 14 mm. Port Elizabeth, Cape of Good Hope.

I lived in Port Elizabeth over forty years during which I collected very many specimens of *C. capensis*, and saw, I think, almost all the shells about which there was anything unusual that were taken by the other local collectors all of whom were my intimate friends. I do not recollect seeing a shell like this and I scarcely think it could have escaped my notice. The most remarkable difference between it and the type form being the brown color of the ribs below the dorsal line.

CYCLADIDÆ OF THE SOUTHERN STATES.

BY V. STERKI.

The year 1904 has brought us many good things in the line of Cycladidæ, especially from the South, from Indiana and from Canada. Our knowledge of these small bivalves from the Gulf States has been very limited. Mr. H. E. Sargent had done some collecting in North Alabama, and Mr. Frierson in North Louisiana, and a few lots had been seen from other states. The collecting of Mr. Smith in Georgia and Alabama, mainly along the Coosa river, and of Mr. A. A. Hinkley in Alabama and Mississippi, have opened that territory known as particularly rich in Strepomatidæ and Unionidæ, and added considerably in regard to systematics as well as geographical distribution. The specimens collected by Mr. Smith were kindly sent for examination by Mr. Bryant Walker, those of Mr. Hinkley partly by himself and partly by Mr. Walker. The following list and notes may be of interest to students of a much neglected yet integral part of our mollusk fauna:

Pisidium virginicum Gm. From Georgia, Alabama and Mississippi, common and rather variable. The prevalent form along the Coosa river is decidedly oblique and rather angular in outlines; it may represent a variety.

Pis. compressum Pr. Common and decidedly variable, making a considerable addition to the already wide range of variation of this species, and some forms seem to represent real varieties.

Pis. kirklandi Sterki. Shoal creek near Florence, Town creek at Montevallo, Ala., full grown and young specimens; seen from the South for the first time. There is a small but distinct roundish, somewhat raised, granular area in the center of each beak, a characteristic feature of the species, not noted in the description (The Nautilus, xiii, p. 11, 1899).

Pis. cruciatum Sterki. Shoal creek, Florence, Ala., collected by Mr. Hinkley. This minute Pisidium, distinguished by the unique formation of its hinge and the shape of the ridges on the beaks, had also been known only from Ohio, Michigan and Illinois (also fossil).

Pis. fallax Sterki. Two badly eroded specimens from the Town creek, Montevallo, Ala. The species is widely distributed and variable, and specimens of it are generally more eroded than any others.

Pis. limatulum Sterki. Various places in Alabama.

Pis. peraltum Sterki. Grenada, Miss., only one specimen, but good and characteristic, collected by Mr. Hinkley. Had been known from Virginia, Kentucky, Illinois and Iowa. A form from Michigan referred to it seems to be distinct.

Pis. noveboracense Pr. Specimens from Alabama and Mississippi were referred, somewhat doubtfully, to this widely distributed and very variable species. Some forms from various places of the three states represented partly by hundreds of specimens, are either varieties or distinct species, and still more materials are desirable.

Pis. atlanticum Sterki. Wetumpka, Ala.

Pis. singleyi Sterki. Tuscaloosa, Ala. (over 200 specimens) and Columbus, Miss. (Mr. Hinkley); Buxahatchee Creek, Calera, Ala. (Mr. Smith). Somewhat different from the Texas form, rather like those from Frierson, La. (collected by Mr. Frierson), but larger.

Several other Pisidia have been seen, represented by small numbers of specimens; with more materials on hand, they may prove distinct species or varieties.

Sphærium solidulum Pr. Several places in Alabama and Georgia, variable. Good numbers, *e. g.*, from the Buxahatchee creek, near Calera, Ala., collected by Mr. Smith; one form closely resembles Ohio specimens regarded as typical, another, in the same lot, is rather different, the sulcation is much finer and the young are of somewhat different shape. The two forms are separable, one by one; whether the latter represent a variety or a distinct species will be ascertained with additional materials. From some places, the specimens were small and poor, yet seemed to be true.

Sph. stamineum Con. Several places in Alabama and Mississippi; over a hundred good specimens from the Town creek, Montevallo, Ala., "in weeds and mud," collected by Mr. Smith. A few specimens in the same lot were rather different, whether distinct, must be made out later.

Sph. striatinum Lam. Georgia, Alabama and Mississippi. Rather different forms from various places seemed to range under this very polymorphous species. Although many thousands of specimens of "Sph. striatinum" were seen from a wide territory, it has not yet been possible to define geographical varieties to any degree of satisfaction, nor to exclude with certainty such forms as may be considered distinct.

Sph. fabale Pr. Several places in Alabama, evidently common; scarcely different from the more northern form (Ohio, etc.).

Sph. occidentale Pr. Near the Coosa river, 300 good specimens, and a few from the Shoal creek, Ala. (low woods, Mr. Smith); Boligee, Ala. (Mr. Hinkley).

*Calyculina** *elevata* Hald. From various places in Alabama; Columbus, Miss.; also received from Frierson, La.

Cal. transversa Say. From a number of places in the three States, generally small and slight, while from Frierson, La., I have received specimens of large size.

Cal. truncata Linsl. Specimens from near Wetumpka, Ala., are rather resembling the Cal. from New York, Ohio, etc.

Cal. securis Pr. (?) A single specimen from Spring creek, Ebenezer Church, Ala., seems to range under that species.

A small, greenish to brownish Calyculina from Grenada, Miss., collected by Mr. Hinkley, may be a variety of Cal. securis; the same, although somewhat different, has been seen from Frierson, La.

Of *Eupera*, some specimens have been collected in Alabama, but were not examined. *Eupera* is known to inhabit all the Gulf States (except Mississippi?), and it is very desirable that more materials be brought up for systematic examination.

Although the specimens seen so far hardly justify speaking of lacking species, yet it may be noted that it was surprising not to see a trace of such widely distributed and common species as *Pisidium variabile* Pr. and *punctatum* Sterki; also none of *Sphærium simile* Say and *rhomboideum* Say and, as it seems, *Calyculina partumeia* Say.

SHELL COLLECTING ON THE MOSQUITO COAST OF NICARAGUA.—III.

BY W. H. FLUCK.

Strombus pugilis nicaraguensis var. nov.

The shell differs from the typical *pugilis*, especially in its smaller size, varying very little from 55 to 62 mm. The spire is regularly

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* Dr. E. von Martens thinks *Calyculina* Clessin should be replaced by *Musculium* Link.

tuberculated, rather high, acute, and sculptured with distinct revolving raised lines; prominent revolving ridges also mark the entire body-whorl, or in some specimens a large portion of it. The color is uniform dark salmon, except the spire, which tends to whiteness, while the aperture is lighter and brighter than the external parts, and anteriorly has just a suggestion of purple. The epidermis is thin.

Specimens were taken in large quantities, and were fully matured, with lip expanded in the characteristic way. I also have six quite young shells, which contained hermit-crabs, in which the lip is incomplete. My attention was first called to the small size of these shells by my friend Mr. Morris Schick, of Tropico, Cal., to whom I sent specimens from Nicaragua about 1902. I was loth, however, to report the shell as a new variety until Mr. C. W. Johnson wrote me, saying: "The beautiful little Stromb certainly deserves a varietal name. * * * * They are gems, and are as distinct as many of the varieties to which names have been given. They are only about half the size of my Florida and West Indian specimens." I then requested Mr. Johnson to describe the shell in THE NAUTILUS, but he generously asked me to do so. I hope this will explain how I came to "butt into" the variety-making business, and will appease the wrath of the bunchers.

I wish to acknowledge that Mr. Johnson has pointed out to me several of the points of difference in my shell, and has also suggested the very appropriate varietal name.

Specimens were taken now and then all along the beach between the Principulka and the Wawa rivers. At Kia, an Indian village 13 miles north of Wounta Haulover, the natives find it in such quantities that it is regularly sought after as an article of food. Boiled "atula," as the Indians call it, is tough eating, almost as tough as old parrot, as I know from experience when dining under the palms at Kia, but "any old thing" satisfies a hungry traveler when plenty of green cocoanut water can be had to wash it down.

Inquiry among the people elicited the fact that most of these molluscs were found just north of the Wawa river, about four miles from the village. I went there and found large quantities of them in the shallow water. This mollusc is a very beautiful one; the eyes are remarkable and seem to be eying one, and are ever on the alert. It is about as active a snail as I ever saw, using its operculum as a lever by which it was enabled to leap out of a glass fruit dish in

which I placed one. The types of this shell are in my own collection and the Boston Society of Natural History. Other collectors, however, have specimens, as I have sent out many sets.

(*To be Continued.*)

NOTES.

Natica intricatoides Hid. on the Algerian Coast.—Last year I mentioned *Natica prietoi* Hidalgo, as found by myself at Algiers. Like *Natica intricatoides*, another very rare species from the Spanish coast, it had not been found before on our shores; now *Natica intricatoides* has been detected also at Algiers by the General de Lamothe, the well-known geologist, who gave me several beautiful specimens. It was associated with *N. filosa*, *N. macilenta* and *N. prietoi*; of the latter he found a single specimen. In the same lot from Sidi-Ferruch in the vicinity of Algiers, I saw a single and very fine *Nassa*, in fair condition, which may be *N. compta* A. Ad., known only as a West African shell.—C. F. Ancey.

Planorbis alabamensis and dilatatus in the Floridian Pliocene.—The only small *Planorbis* reported from the Caloosahatchee Pliocene in Dall's great work on that fauna is *P. exacutus* Say. Some years ago I received from Mr. Johnson numerous specimens of another species, *P. alabamensis* Pils. They differ constantly from the recent form in having a decidedly smaller umbilicus. This variety may be called *P. alabamensis avus.* With these there were a few specimens of *P. dilatatus* Gld., which also differ a little from the typical form in having a smaller aperture and distinctly thickened lip.—H. A. Pilsbry.

Note on Canadian Unio luteolus.—While examining recently the shells in the collection presented to the Smithsonian Institution by Dr. Isaac Lea, I was surprised to observe that a large green specimen of *Unio luteolus*, from the "Rideau Canal, Ottawa, Canada," had written upon one of its valves in his well-known handwriting the name "*U. radiatus.*" The entry number of the shell is 85042. The error would not be remarkable if made by an authority of less repute than Dr. Lea, as many of the male *luteolus* found in the Rideau Canal resemble *radiatus* in outline, coloring and even in the

texture of the epidermis, urged by some as a distinguishing characteristic. A full series of the shell from the Rideau Canal here, where it occurs abundantly, and where *radiatus*—common elsewhere in this vicinity—does not occur at all, would however be readily recognized as *luteolus*. But Dr. Lea's identification of the Ottawa shell as *radiatus* is liable to mislead, and notwithstanding this correction doubtless will mislead many students, who while his great collection endures will have recourse to it for the solution of not a few difficulties.—F. R. Latchford, Ottawa, Ont.

PUBLICATIONS RECEIVED.

Annotated List of the Types of Invertebrate Cretaceous Fossils in the collection of the Academy of Natural Sciences of Philadelphia. By Charles W. Johnson. Proc. A. N. S. Phila., 1905, pp. 4-28. Four hundred entries, exclusive of synonyms, are comprised in this catalogue of types, which is one of the fruits of Mr. Johnson's labor in working over the entire collection of American Cretaceous invertebrates in the Academy's collection. The following groups are represented: Corals, 5 species; Annelida, 8 species; Polyzoa, 31 species; Brachiopoda, 4 species; Echinoderms, 23 species; Crustacea, 4 species; Mollusca, 325 species. No attempt at full synonymy is made, but the author's broad acquaintance with the subject enables him to add many critical notes and to bring the list abreast of the times in nomenclature. Three new species are introduced: *Nemodon conradi* Johnson, *Cucullæa gabbi* Johnson, *Straparollus deplanatus* Gabb.—H. A. P.

Notes on the Molluscs, Reptiles and Amphibians of Ontonagon Co., Michigan. By A. G. Ruthven. Sixth Ann. Rep. Mich. Acad. Sciences. Records of Mollusca from the Upper Peninsula have been very rare hitherto. This list of 71 species therefore fills a gap in the map.

Fossils of the Bahama Islands, with a list of the non-marine Mollusks. By Wm. H. Dall. Extract from "The Bahama Islands." The marine fossils noted are all of recent species. *Phacoides pennsylvanicus, Codakia orbicularis, Tellina radiata, Arca occidentalis*

and *Arca reticulata* are figured. The list of non-marine forms comprises 147 species and numerous varieties, the following being described as new: *Cerion rhyssum*, *Cepolis* (*Hemitrochus*) *exumana*, *C.* (*H.*) *agassizi*, *C.* (*Plagioptycha*) *gregoriana*, *C.* (*P.*) *inaguana*, *C.* (*P.*) *pharcida*, and a number of varieties. All are figured. An interesting discussion of the relationships and history of the fauna precedes the descriptions.

Check List of the Mollusca of New York.—By Elizabeth J. Letson. (Bull. 88 N. Y. State Museum, 1905).[1] Miss Letson has brought together references to the New York mollusca from all sources from the time of DeKay (1843) to the present time; so that her check list is a bibliography as well. The marine fauna is not a rich one. Of non-marine forms, 243 species and some varieties are recorded; and though a few given on the authority of old records will probably be deleted, yet the number of species remaining is remarkably large for a Northern State. The work will be useful to all interested in the species of our northern and middle States.—H. A. P.

Bemerkungen ueber die Chitonen-Sammlung im Zoologischen Museum zu Leiden.—Von Dr. H. F. Nierstrasz. Notes Leiden Mus., vol. xxv. Dr. Nierstrasz is known as a careful and competent author on Chitons by his report on those of the Siboga Expedition. In the present paper he describes as new *Callistochiton leidensis* from Santa Elena and *Callistochiton porosus* from Rio Janeiro, and gives interesting notes on various species of *Liolophura*, *Onithochiton* and other genera. Full details are given of Dr. Nierstrasz's genus *Squamipleura*, from a series of 40 examples from near Timor. It stands between *Acanthopleura* and *Liolophura*, but nearer the latter. A few locality records, on the authority of specimens in the Leiden Museum (no collector mentioned) are undoubtedly erroneous. *Ischnochiton magdalensis* surely never came from Martinique, nor *I. punctulatissimus* from the Gulf of Mexico. The record of *Nuttallina scabra* from Chili is almost as doubtful; and only the most definite data would justify us in adding *Acanthopleura granulata* to the faunæ of Magellan Strait and the Cape of Good Hope.—H. A. P.

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[1] Pp. 112, New York State Educational Department, Albany.

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LAND SHELLS OF THE FLORIDA KEYS.

BY HENRY A. PILSBRY.

During the spring of 1904 Mr. Clarence B. Moore made an exploration of the Keys of Florida primarily for archæological research, from Key Marco southward to Cape Sable and Long Key, then northward on the East Coast to Lake Worth. During this cruise he collected shells, particularly *Liguus* and *Oxystyla*. The latter will form the subject of special report. Subsequently he sent Messrs. Fowler and Brown, of the academy staff, to the outer keys, Key West to Duck Key. The land shells collected are enumerated below. In addition to the species of the Keys I have included those taken at Cape Sable. The fauna of the mainland at that place is related to that of the Keys, being practically insulated by the everglades which extend across the peninsula.

With the exception of Key West and Key Largo, very few records of land shells have heretofore been made from the Keys, and from many of them no mollusks whatever have hitherto been reported. The prevalence of the same species on most of the Keys supports Professor A. Agassiz's theory that that land area is in process of disintegration, the present islets being remnants of a once continous land-mass.

Cyclostomatidæ.

Chondropoma dentatum Say. Two miles east of Planter, Key Largo, East end Windly's Island or Umbrella Key, Lignum Vitæ Key, West end Upper Matacumbe Key, Summerland Key, Big Pine Key, Little Pine Key, Sugar-loaf Creek, Sugar-loaf Key and Key West.

Truncatellidæ.

Truncatella caribeensis 'Shy' Rve. Rabbit Key, Monroe county; Bahia, Honda Key, Key Largo, Big Pine Key, Sugar-loaf Key, Key West.

Truncatella bilabiata Pfr. Blue Hill Island near Goodland Point, Key Marco, near Punta Rassa, Fakahatchee Key, Ten Thousand Islands, Pavilion Key, Bahia Honda Key, Key Largo, Big Pine Key, Sugar-loaf Key, Key West.

Truncatella sp. Sugar-loaf Key.

Helicinidæ.

Helicina orbiculata Say. Little Palo Alto Key, Big Palo Alto Key, Lignum Vitæ Key, Snipe Key, Key West, Pineland, northwest end of Pine Island, Fakahatchee Key in Ten Thousand Islands, East Cape, Cape Sable, Little Pine Key.

Helicina tantilla Pils. Duck Key and Grassy Key. Originally described from Palm Beach, on the east coast.

Helicidæ.

Cepolis varians Mke. South end of Key Biscayne, Cape Florida, West end of Upper Matacumbe Key.

Polygyra cereolus (Mühlf.). East end Lower Matacumbe Key; Long Key; Big Pine Key; Little Pine Key; Sugar-loaf Key at Sugar-loaf Creek; Boca Chica Key; near Blind Pass, Middle Cape, Cape Sable, and a small Key opposite Flamingo, in the same region.

Polygyra cereolus carpenteriana (Bld.). Western end of Upper Matacumbe Key; Lignum Vitæ Key; Summerland Key; Cudjoe Key; Key West near Punta Rassa; Blue Hill Island near Goodland Point, Key Marco; Fakahatchee Key in the Ten Thousand Islands; Turner Key; Rabbit Key; Pavilion Key.

Polygyra uvulifera (Shuttlw.). Big Pine Key; Blue Hill Island near Goodland Point, Key Marco; Turner River, Turner Key; Middle Cape and East Cape, Cape Sable.

Thysanophora selenina (Gld.). Big Pine Key; Blue Hill Island near Goodland Point, Key Marco; Fakahatchee Key in the Ten Thousand Islands. (*Helix selenina* Gld.=*Helix vortex* Pfr., preoc.).

Thysanophora plagioptycha (Shuttl.). Mainland at Middle Cape Cape Sable; Duck Key; Big Pine Key.

Thysanophora sp. undet. Little Pine Key.

Bulimulidæ.

Drymæus dominicus (Rve.). Cutler; Fakahatchee Key, Ten Thousand Islands.

Drymæus multilineatus (Say). Big Palo Alto Key; Western end of Upper Matacumbe Key; Lignum Vitæ Key; Eastern end of Lower Matacumbe Key; Noname Key; Big Pine Key; Little Pine Key; West end of Cudjoe Key; Sugar-loaf Key; Summerland Key; Boca Chica Key; Blue Hill Island near Goodland Point, Key Marco.

Liguus fasciatus (Müll.).

Oxystyla undata reses (Say).

Oxystyla floridensis (Pils.).

These species will form a special report.

Urocoptidæ.

Urocoptis poeyana (Orb.) *var.* Big Pine Key.

Microceramus pontificus (Gld.). Lignum Vitæ Key; Big Pine Key; Summerland Key.

Microceramus floridanus Pils., *var.* Fakahatchee Key, Ten Thousand Islands; Turner Key.

Cerionidæ.

Cerion incanum (Binn.). Southern end of Key Biscayne, Cape Florida; Western end of Long Island or Cantation Key; Eastern end of Windly's Island or Umbrella Key; Indian Key; Eastern end Lower Matacumbe Key; Long Key; Grass Key; Vaca Key; Bahia Honda Key; Little Pine Key; Noname Key; Big Pine Key; Summerland Key; Cudjoe Key; Sugar-loaf Creek, Sugar-loaf Key; Snipe Key; Boca Chica Key; Key West. Found everywhere in copious quantity.

Strobilops sp. undet. Big Pine Key. A young shell of the *labyrinthica* type.

Pupillidæ.

Pupoides modicus (Gld.). Fakahatchee Key, in the Ten Thousand Islands.

Bifidaria pellucida (Pfr.). Big Pine Key, mainland at Middle Cape, Cape Sable.

Bifidaria rupicola (Say). Pineland at northwest end of Pine Island; Fakahatchee Key, Ten Thousand Islands; mainland at Middle Cape, Cape Sable.

Bifidaria contracta (Say). Pineland, northwest end Pine Key; mainland on Middle Cape, Cape Sable.

Vertigo rugosula oralis Sterki. Mainland at Middle Cape, Cape Sable.

Vertigo sp. undet. Grassy Key. An imperfect shell.

Achatinidæ.

Melaniella gracillima floridana Pils. Big Pine Key.

Glandinidæ.

Glandina truncata (Brug.). Hammock near north mouth of Suwanee river, near Punta Passa; Pineland, northwest end Pine Island, also northeast end Pine Island; Blue Hill Island near Goodland Point, Key Marco; Fakahatchee Key, in the Ten Thousand Islands; Russell's Key; Wiggins' Key, Sandfly Pass; Lossman's Key; Big Pine Key.

Glandina truncata minor Binn. Mainland, Middle Cape, Cape Sable; East end of Lower Matacumbe Key; Big Pine Key.

Zonitidæ.

Guppya gundlachi (Pfr.). Pineland, Northwest end of Pine Island; Fakahatchee Key in the Ten Thousand Islands; mainland at Middle Cape, Cape Sable; Sugarloaf Key.

Guppya miamiensis Pils. Grassy Key.

Zonitoides arboreus (Say). Mainland at Middle Cape, Cape Sable.

Zonitoides dallianus ('Simpson' Pils.). Fakahatchee Key in the Ten Thousand Islands.

Zonitoides minusculus (Binn.). Big Pine Key; Fakahatchee Key in the Ten Thousand Islands; mainland at Middle Cape, Cape Sable.

Zonitoides minusculus alachuanus (Dall.). Pineland at northwest end of Pine Island.

Succineidæ.

Succinea campestris Say. Lignum Vitæ Key; Long Key.

Succinea floridana Pilsbry, n. sp.

Shell obesely ovate, thin but strong for the genus, *opaque*, flesh-tinted or pinkish-white, marked with corneous-fleshy streaks, and usually a few scattered clear dots, readily seen by holding the shell up towards the light; apical whorl usually reddish-brown. Interior more or less deeply *tinted with ochre-yellow*. Whorls $3\frac{1}{2}$ to $3\frac{3}{4}$, very

convex, the last whorl evenly convex. Sculpture of fine, unequal growth-lines and coarse but low wrinkles, with some indistinct malleation on the last whorl. Aperture ovate, short; outer lip well arched; columella oblique and nearly straight.

Length 12.3, diam. 7.2, length of aperture 8 mm.

Length 12.2, diam. 7, length of aperture 7.8 mm.

Length 12.8, diam. 7, length of aperture 8 mm.

Northern end of Big Pine Key, abundant in long grass, types no. 87358 A. N. S. P., collected by Messrs. Fowler and Brown, June, 1904. Other localities are Summerland Key, Cudjoe Key, Sugarloaf Key, Boca Chica Key, Key West. On the mainland and keys of west Florida at Blue Hill Island, near Goodland Point (C. B. Moore), and one mile east of Marianna, Chipola river (C. W. Johnson, 1900, one bleached specimen).

This species has hitherto been considered a form of *S. luteola*, from which it differs in the much shorter contour and more convex last whorl. I have seen no specimens from Florida referable to *luteola*. *S. floridana* is also closely related to *S. campestris*, which is still more obese, and more strongly corrugated, with the spire less slender. The most nearly related forms are, however, the Antillean *S. ochracina* Gundl. of eastern Cuba and *S. dominicensis* Pfr. of Santo Domingo. In both of these, however, the color is more lemon than ochre-yellow. *S. dominicensis* is a smoother, white and very beautiful shell. *S. ochracina* is somewhat rough, streaked white and corneous with a pale lemon tint throughout, and with a longer aperture than *S. floridana*.

S. floridana varies a good deal in size. The largest seen is from Key West, 14 mm. long, and the smallest adults are from Boca Chica Key, $8\frac{1}{2}$ mm. long, with $3\frac{1}{2}$ whorls.

A NEW CALIFORNIAN HELIX.

BY REV. J. ROWELL.

Helix (*Epiphragmophora*) *sequoicola soquela* n. subsp.

Shell broadly umbilicate, thickly and regularly striate, very dark brown approaching black, of uniform color with the exception of two parallel white bands above the middle of the body-whorl, shell depressed with depressed spire, whorls seven, the last much inflated, strongly banded within. Greater diameter 28 mm., height 12 mm.

Differs from *dupetithouarsi* and *sequoicola* in much darker color, more inflated aperture, depressed form, greater breadth, and enclosed band of the same color as the body of the shell.

Habitat, Santa Cruz mountains midway between Soquel creek and Skyland.

REMARKS ON SOME LAND AND FRESH-WATER SHELLS FROM THE NEW HEBRIDES, WITH DESCRIPTION OF NEW SPECIES.

BY C. F. ANCEY.

The following species represented in my collection were obtained from various sources, principally from my regretted friend E. L. Layard, the well-known student, and from Dr. Ph. François, who collected somewhat extensively in the Archipelago several years ago, and has explored chiefly the northern group. To the latter I am particularly obliged for useful data on several of the localities he visited, and for the liberal gift of specimens, most of these, however, having been examined by the late Mr. Mabille and forming part of the collection of the Paris Museum.

1. *Lamprocystis Layardi* (Thomson).

Hab. Vate island (Glisson, fide Layard). This form is united to *L. guttula* Pfr., by Mr. E. R. Sykes (Proc. Malac. Soc., London, 1902, p. 196), but having specimens of both I do not share this opinion, the general aspect being the same, but the columellar insertion being different. It was well described and figured by Mr. J. H. Thomson (Proc. Zöol. Soc., 1885, p. 25, with fig.).

2. *Macrochlamys* (?) *Annatonensis* (Pfr.).

Hab. Vate island (Glisson).

This form is closely allied to "Zonites" Vitiensis Mousson, of the Viti group. The generic reference is doubtful, but I consider they are more nearly related to *Macrochlamys* than to the European genera *Vitrea* or *Polita*.

3. *Endodonta tenuiscripta* Anc.

Hab. Mallicollo island.

The original description states that the shell is "widely umbilicated." One must read "*not* widely umbilicated" (see NAUTILUS, 1896, p. 90).

4. *Draparnaudia singularis* Pfr., var. *diminuta* Anc.

Hab. Aneitum (= Annaton) island (fide E. L. Layard).

I venture to give this varietal name to the shell I have mistaken for the true *H. singularis* Pfr. (see NAUTILUS, 1897, p. 27), which is described from Aneitum. According to Mr. Sykes (loc. supra cit., p. 197), specimens of the latter, so named by Dr. Pfeiffer, are in the British Museum, and are the ordinary, large, strongly-keeled form usually met with in collection. The present one is also strongly but obtusely angled, has 6 whorls only and the last whorl is not deflected at all in front. It is $6\frac{1}{2}$ mm. high and 6 mm. wide. In size it is quite like *D. Walkeri* Sykes (loc. supra cit., p. 197, fig. II), but the latter appears to have a higher body-whorl and more rounded periphery. It was collected on Espiritu Santo island, very distant from that of Aneitum.

5. *Dendrotrochus Eva* (Pfr.).

Hab. Vate island.

It is peculiar, I think, to the above island. The specimens are more commonly white, sharply keeled, with or without a brown lip. In others the keel is more obtuse, while in some cases there is a brown zone between the keel and the suture.

6. *Dendrotrochus Layardi* (Hartm.).

Hab. Aura (= Aurora island), fide Layard; also Espiritu Santo island (J. J. Walker, Dr. Ph. François).

I have seen an extensive series of this fine shell, originally described as "*Oxychona*." It is now well established that *Oxychona* is a genus of *Bulimulidæ* allied to *Zaplageus* and *Drymæus*, restricted in its distribution to Brazil. The present species is related to *D. Eva*, which it appears to replace in the northern group. The following variations occurred to my notice:

a. Plain ashy-white.

b. Ornamented with a narrow brown line on the keel and the suture.

c. With a wide dark-brown band between the keel and the sutures, sometimes extending, sometimes fading on the upper whorls.

The lip is either brown or whitish and the base, around the axis, is frequently tinged with brown. There are always some minute spots and black, oblique lines on the pale ground.

7. *Diplomorpha Brazieri* Hartm.

Hab. Espiritu Santo island. A scarce species, never found, I suppose, in fresh condition.

8. *Diplomorpha Delantouri* Hartm.

Hab. Aura (= Aurora island), Delantour, fide Hartman.

The numerous specimens from Espiritu Santo island (Ph. François), belong to a variety *major* (long. 21–25, diam. 15–16 mm.), but otherwise are quite like the type.

9. *Diplomorpha ruga* Hartm.

Hab. Espiritu Santo island.

10. *Diplomorpha Bernieri* Hart.

Hab. Espiritu Santo island. I am informed that "Segon island," quoted by Dr. Hartman, does not exist in the New Hebrides. The locality is to be corrected to "Canal du Second," Espiritu Santo island.

11. *Placostylus* (*Pœcilocharis*) *Françoisi* Mab.

The types which I have had the opportunity of examining through the kindness of Prof. Joubin, in the Paris Museum, appear to be conspecific with *P. hebridarum* of the same author.

12. *Partula Auraniana* Hartm.

Hab. Buka-buka, Torres group (Dr. P. François).

13. *Opeas oparicum* Pfr.

Hab. Espiritu Santo island (Dr. P. François).

14. *Auriculus elongatus* Pfr.

Hab. Espiritu Santo island (Dr. P. François).

15. *Physa Layardi* Anc., n. sp.

Testa oblongo-attenuata, tenuis, nitida, pallide corneo-virens, indumento ferrugines plerumque coöperta. Spira conoidea, satis producta, regularis, acuta. Anfractus 5 convexi, sutura subappressa, obliqua divisi, lineis incrementi vix conspicuis, in ultimo antice curvatis; ultimus ovalis, basi attenuatus. Apertura subobliqua, superne angustata, irregulariter ovalis, intus nitida, basi interdum lacteo-subincrassata, margine sinistro antrorsim flexuoso. Columella crassa, lactea, intus late pliciformis, plica parum prominente. Peristoma simplex, acutum, ad columellam anguste reflexum, marginibus callo tenui junctis.

Long. $9\frac{1}{4}$, diam. $5\frac{1}{4}$, alt. apert. $5\frac{3}{4}$ mill.

Hab. Vate island (Glisson, fide E. L. Layard).

An inconspicuous little form, like many of those described from Australia and New Caledonia, but sufficiently distinct. No species of this genus has hitherto been recorded from the New Hebrides.

16. *Palaina Françoisi* Anc.

Testa sinistrorsa, oblique et compresse rimata, subcylindraceo-

oblonga, tenuis, pallide cinereo-fulvescens, acute costulata, costulis filiformibus, parum nitens. Spira oblongo-attenuata, apice minuto. Anfractus $6\frac{1}{2}$ convexi, sutura impressa discreti, embryonales læves, sequentes remote et argute chordato-costulati, penultimus multo densius costulatus, dorso subgibbosus, ultimus antice distincte planulatus, infra attenuatus, ad aperturam valde ascendens, dorso laxius liratus. Apertura fere recta, circularis, columella intus obscure subinflata. Peristoma continuum, undique modice expansum.

Long. $2\frac{3}{4}$, diam. vix $1\frac{1}{2}$, alt. apert. 1 mill.

Hab. Espiritu Santo island. A single specimen found in the aperture of Helicina Layardi, Hartm.

The genus has not yet been recorded from the New Hebrides. Some have been ascribed to "Lord Howe's island, New Hebrides," but this particular island is the one lying between the coast of New South Wales and Norfolk island, although another islet in the New Hebrides bears the name of "Lord Howe." The present species is allied to Palaina Montrouzieri, of New Caledonia, but of different sculpture.

17. *Omphalotropis conella* Sykes (??) var.

Testa minute umbilicata, conico-turbinata, solidula, castanea, haud nitens, costulis cuticularibus verticalibus remotis, subobliquis, atque lineis elevatis spiralibus parum conspicuis, infra peripheriam distantibus et validiusculis sculpta, carina peripherica et lira circa umbilicum distinctis. Spira conoidea, obtusiuscula. Anfractus 6 convexiusculi, sutura impressa, ultimus medio angulatus, infra 5 liris spiralibus munitus. Apertura leviter obliqua, supra angulata. Peristoma simplex, acutum, ad columellam subsinuatam vix expansiusculum.

Long. $4\frac{1}{2}$, diam. vix $3\frac{1}{2}$, alt. apert. 2 mm.

Hab. Espiritu Santo island.

Only one specimen was obtained. This little shell is shaped like Sykes' *O. conella*, of which it may perhaps be considered a variety or a fresh example; however it comes from a very distinct locality and it may prove to be specifically distinct.

18. *Helicina Layardi* Hartm.

Hab. Espiritu Santo. All the specimens have a reddish band. It is the form recorded by Mr. Mabille as *H. Bairdi*, and I am disposed to share Mr. Sykes' opinion that it is simply a form of *H. sublævigata* Pfr. The sculpture is precisely the same, as described by

Mr. E. A. Smith in his report on the Land and Freshwater Shells of the Challenger Expedition.

19. *Potamopyrgus brevior* Anc.

Testa parva, oblongo-attenuata, nitidula, pallide cornea, fere imperforata, lineis incrementi indistinctis, indumento ferrugineo tecta. Spira sat producta, conoideo-attenuata, obtusula. Anfractus 5 convexiusculi, sutura impressa, ultimus oblongus, infra attenuatus. Apertura recta, imo basi antice leviter provecta, oblique oblongo-ovata, basi ad sinistram distincte prodiens, supra attenuata, marginibus continuis, externo subobtusato.

Long. $2\frac{1}{2}$, diam. $1\frac{1}{4}$, alt. apert. 1 mm.

Hab. Vate Island (fide Layard).

Very near to *P. whiteleggei* Braz., from Lord Howe's Island, but with shorter spire. This is the first record of the genus in the New Hebrides. Only one specimen was seen. The genus is also found in the Viti group, and I have from them a very closely allied species.

20. *Melania setosa* Swains.

Hab. Aurora Island (Layard).

21. *Melania mauiensis* Lea.

Hab. same island (Layard).

22. *Septaria suborbicularis* Sowerby.

Mr. Layard wrote me he procured one specimen nearly 2 inches long.

Hab. Aurora Island.

A FOSSIL FORM OF OREOHELIX YAVAPAI, PILSBRY.

BY T. D. A. COCKERELL.

Oreohelix yavapai compactula, n. subsp.

Shell compact; spire elevated, pyramidal; last whorl somewhat gibbous above, with a strong cord-like keel extending to the aperture; shell with coarse, oblique striæ, especially prominent on the last two whorls above, and also with fine spiral lines, most prominent on the last whorl, where they are more or less beaded; sometimes the spiral lines are scarcely apparent, but this is probably the result of weathering. Five specimens, two with the spire broken; the dimensions are:

Max. diam. 13, $12\frac{1}{2}$, 11, 13, 12 mm.

Alt. (at right angles to axis) $8\frac{1}{3}$, $7\frac{1}{2}$, $6\frac{1}{2}$ mm.

Hab.—Found in a pleistocene deposit in the Pecos Cañon, New Mexico, a few miles above the Vallé Ranch, by my wife and Dr. M. Grabham, in 1903. With them occurred a form of *O. strigosa*, which seems not to differ essentially from the smaller forms of the *huachucana* group. The largest has max. diam. $17\frac{1}{2}$, alt. 10 mm.[1]

NOTES AND NEWS.

REPUBLICATION OF THE MUSEUM BOLTENIANUM, PART 2, 1798.

The rarity of part 2 of this work, which relates to Mollusca, is well known to students. In response to a number of inquiries it is proposed to reproduce a few copies, by photographic facsimile, from the Crosse copy now in the British Museum (Natural History).

The large number of pages (204) must render this a somewhat costly task, and we should be glad to know if you would care for a copy to be reserved for you at the price of £2 (two pounds).

The work would be done, under our supervision, by Mr. F. W. Reader.

The issue will be limited, numbered and signed, and could be prepared for distribution during autumn.

It must be clearly understood that unless sufficient subscribers are forthcoming no issue can be made.

Please address reply to Mr. Sykes.—E. R. SYKES, C. DAVIS SHERBORN.

NEW LOCALITY FOR LYOGYRUS BROWNII CARPENTER. — Several years ago the lakes in Roger Williams Park, Providence, R. I., were drawn off, the bottoms dredged out and the contents thrown out upon the land. They were left empty, exposed to the sun for two years and all the species of mollusks destroyed. There were fourteen species in the lakes and thousands of specimens. Among others were the *Lyogyrus Brownii*, and as they were never discovered anywhere else, I supposed (the locality being exhausted) that they were extinct. Last week a young collector here, Mr. Frank Perry, has found in Old Warwick Pond, about four miles

[1] *O. y. compactula* seems to me to be a form or subvariety of *O. y. neomexicana*, which occurs living in the same general region.—H. A. P.

from the Park Lakes, and having no connection whatever with them, a new locality for the *Lyogyrus*, and he assures me that he found them there in great quantities.—H. F. Carpenter.

PUBLICATIONS RECEIVED.

The Mud Snail: Nassa obsoleta.—By Abigail Camp Dimon. (Cold Spring Harbor Monographs, V, 1905.) This is a very exhaustive treatise on its distribution, structures and functions, breeding and development; experiments on its relation to external factors, such as light, gravity and currents: resistance to desiccation, and different densities of water; response to mechanical stimuli, food, etc.—C. W. J.

Notes on some Fresh-water Shells from the Yukon Territory.—By J. F. Whiteaves (The Ottawa Naturalist, xix, p. 63, 1905). Five species of *Pelecypoda* and ten species of *Gasteropoda* are recorded.

List of Land and Fresh-water Shells from the District of Keewatin. — By J. F. Whiteaves (Geological Survey of Canada, 1905). About forty species are recorded.

A New Genus and Several New Species of Land Shells Collected in Central Mexico by Dr. Edward Palmer.—By William Healey Dall (Smiths. Misc. Coll., Vol. 48, pp. 187–194, plates 43, 44). The new genus *Hendersonia*, dedicated to Mr. John B. Henderson, Jr., is a flattened, discoidal, many-whorled snail somewhat like *Polygyra cereolus*, with the last whorl free and upturned, *Anostoma* fashion, and with anatomical characters showing it to be related to *Holospira*. Nothing of the sort has been known among Cylindrelloid snails hitherto, and the new genus materially enlarges our conceptions of that type of snails. A single species, *H. palmeri*, is described. Subsequently learning that the name *Hendersonia* had been used by Wagner (in *Helicinidæ*, 1905), the new genus was renamed *Hendersoniella*. Five new species of the genera *Xanthonyx*, *Streptostyla*, *Schasicheila* and *Sphærium* are described. The new *Xanthonyx potosiana* is the greatest of its kind, with a shell 18 mm. in diameter.—*H. A. P.*

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NOTES ON YOUNG UNIONIDÆ.

BY L. S. FRIERSON.

Recently while searching for young Unionidæ I was rewarded by obtaining a dozen little fellows averaging a quarter of an inch long. One of these, a magnificent little *Lampsilis anodontoides* Lea, less than one-fourth of an inch in length, exhibiting the glochidial valves, was provided with a byssus four or five inches long, thus confirming my previous observations. Several specimens of *L. gracilis* Barnes, and one of *L. lævissimus* Lea, were also taken so provided. The byssus of one of these was fully eight inches in length. Several *L. texasensis* were also taken, as already recorded by me. Several very small *Anodonta imbecilis* Say, were captured, but these did not seem to have byssi. Some time after, I was rewarded in an hour's search, by a single specimen of *Unio tetralasmus* Say, perfect in every respect, and only $\frac{3}{16}$ of an inch in length. It was a jewel, but no sign of its being provided with a byssus could be detected.

Thus these preliminary and very scanty observations seem to limit the possession of a byssus to *Lampsilis* (including in this term the allied genus *Medionidus*).

The byssi of these specimens came out of a narrow *slit* in the central ridge of the foot, and located about the anterior third of the shell, and all were firmly enough attached to support the weight of the shell in the air, and of course amply strong to suspend the shell while partially supported by the water.

These baby shells revealed some facts about the so-called beak-

sculpturing, which, when further studied, may form a subsequent note for The Nautilus.

NEW VARIETIES OF CREPIDULA RUGOSA NUTT. FOUND ON NATICA AND ON NORRISIA.

BY MRS. M. BURTON WILLIAMSON.

In the July number of The Nautilus, Dr. Wm. H. Dall describes a variety of *Crepidula nivea* C. B. Adams, from San Pedro, California, and this reminds me of a variety found upon Natica that has not, to my knowledge, been described.

When I began collecting shells in San Pedro Bay some years ago, I found a specimen of this variety and it was for years a puzzle to me. Although only a dead, white shell, it would not classify with specimens in any tray of Crepidulæ. It did not look like an aberrant form, so I was loth to label it as such. It was a white, porcellanous specimen, shaped like some *Crepidula rugosa*, but much more pellucid-looking, but differed from *Crepidula excavata* Brod., in being thicker and in not having either the remote apex or the oblique growth of that form. It was also larger in size than any *Crepidula excavata* I had seen. Some seven or eight years after finding this dead specimen, two live ones, excepting that the animal had recently been removed, were found in the bay. I immediately recognized the white, granular form, and these specimens were maculated with chestnut-colored spots, and as would be expected, these live forms were thinner and more pellucid. I afterward found this puzzling variety *in situ* on a piece of Natica, *Lunatia Lewisii*.

If a specimen varies from the type sufficiently to be detected, dead or alive, it merits a varietal name, and for my own convenience I have labeled it on my cards. For the convenience of other students this white porcellanous shell with its brown spots might be labeled *Crepidula rugosa* Nutt. var. *naticarum*.

There is another variety of *Crepidula rugosa* Nutt. found on *Norrisia norrisii* Sby. This *Norrisia* is a smooth, reddish-brown turban shell, whose habitat appears to be on kelp. The Crepidulæ found on these shells are of a light magenta-pink in the interior. These slipper shells are usually much flatter than typical *C. rugosa*,

and the form of the septum or deck also varies. Besides variation in color and form the Norrisia specimens are more porcellanous than *Crepidula rugosa* (but not so much so as the form found on Lunatia), and the texture does not run into layers as in the typical *C. rugosa.* Some years ago this form was often distributed by collectors and labeled *Crepidula adunca* Sby. In notes on the mollusks of the vicinity of San Diego, Cal., and Todos Santos Bay, Lower California, by Charles R. Orcutt, he lists *Crepidula adunca* Sby. as "not rare on *Norrisia norrisii.*" While some of the forms found upon Norrisia have the remote apex of *C. adunca*, I have never seen one with the "short, deeply sunk and slanting deck, and a *hole above it passing up the spire*," as described by Philip P. Carpenter in his catalogue of Mazatlan Mollusca in his note on the *adunca* form. Then again, *C. adunca* is found upon smaller univalves where the base for it is much contracted; for instance, I have seen it *in situ* on *Drillia penicillata* Cpr., and as one would infer, the shell has its sides closer together than the form found upon Norrisia. For the Norrisia form I would suggest *Crepidula rugosa* Nutt., variety *norrisiarum.*

A NEW SPECIES OF LYMNAEA FROM OHIO, WITH NOTES ON LYMNAEA PARVA LEA.

FRANK COLLINS BAKER.

Lymnæa sterkii n. sp.

Shell small, elongated, turreted, rather thin; color light yellowish-horn; surface dull to shining, marked by distinct, raised, crowded, growth lines, without spiral lines; protoconch very small, rounded, smooth, wine-colored; whorls $5\frac{1}{2}$, very convex, the last distinctly shouldered; spire narrow, rather acute, turreted, a trifle longer than the aperture; sutures very deeply impressed; aperture ovate, almost continuous in some specimens; peristome thin, acute; columella almost straight, without a plait but with a faint thickening; inner lip reflected to form a broad, flat callus which is appressed to the parietal wall and projects widely over the umbilical region; umbilicus rather wide and deep.

Length 7.75; width 3.50; aperture length 3.50; width 1.75 mm.

Length 7.75; width 4; aperture length 3.25; width 2 mm.
Length 8; width 3.50; aperture length 3.50; width 2 mm.
Length 7; width 3.50; aperture length 3.25; width 2 mm.

Habitat: Twelve miles west of Cleveland, Ohio, in a small, swampy brook.

This curious species was at first thought to be Lea's *exigua* but his description does not cover the present species and the figure is totally unlike it. The type of *exigua* is not in existence. It is probably a small form of *desidiosa* and its best disposition would seem to be as a synonym under that species.

L. sterkii is narrower than *humilis*, the whorls are more shouldered and the aperture is much more oval. The wide-spreading columella callus is also different and peculiar. It has a superficial resemblance to *owascoensis* Baker, but that species has six full whorls, the whorls are more shouldered, the aperture is more elliptical, the umbilicus is more open and the columella callus is not so wide. Juvenile specimens are rounder and more robust than the adult forms.

The specimens were collected by Dr. Victor Sterki, to whom the species is dedicated.

Lymnea parva Lea, Proc. Am. Phil. Soc., II, 33, 1841.

Shell very small, thin, ovate-conic, turreted; color greenish-horn; surface dull, marked by heavy, crowded growth lines; protoconch very small, rounded, light-horn colored; whorls 4½, rounded and shouldered; spire obtusely conic, turreted, a trifle longer than the aperture; sutures very deeply impressed; aperture roundly ovate; peristome thin, acute; columella almost straight, covered with a rather heavy callus which is reflected over the flat parietal wall and also forms an erect border to the umbilicus, which is open and deep.

Length 3.25; width 2; aperture length 1.50; width 1 mm.
Length 4; width 2; aperture length 2; width 1 mm.
Length 3; width 2; aperture length 1.25; width .9 mm.
Length 4.25; width 2; aperture length 1.75; width 1 mm.

Habitat: marsh on Lake James, Steuben Co., Indiana (Daniels); Cincinnati, Ohio (Lea); Lilycash Creek, Joliet, Ill. (Handwerk); Northern Illinois, in drift (Sterki).

This little species, the smallest of our American Lymnæas, belongs to the section of this genus typified by *humilis* Say and *curta* Lea. It is more nearly related to *curta*, appearing at first sight to be a

small example of that species. Besides its small size it differs from that species in having the sutures more impressed, the aperture longer, the spire slenderer and the whorls more shouldered. It seems to be quite distinct and easily recognized.

There is some variation in the length of the spire, many specimens having a rather long spire while in others the spire is much depressed and the whorls humped, this last being in abnormal forms.

This species was at first thought to be a new one, but after careful study it seems to agree very well with Lea's description of *parva* and with specimens so named by him in the Smithsonian Institution. In his remarks under *parva* he says, "This is the smallest species which has come under my notice. In general form it resembles *L. curta*, herein described. It is rather less inflated, has a longer aperture, and is diminutive. The perforation, too, is smaller and the columella more curved.

In a paper entitled "Critical Notes on the Smaller Lymnæas," in the March NAUTILUS, the writer made this species a synonym of *curta*, but a study of the material from Lake James, which is unusually abundant, would make it seem to be a well-recognized species. Specimens were submitted to the writer by Dr. Sterki, Mr. Bryant Walker and Mr. L. E. Daniels, the latter gentleman having collected them.

Parva would seem to be a common species, and will probably be found in many cabinets under the all-embracing name of "*humilis*."

VERTIGO PERRYI, N. SP.

BY V. STERKI.

Shell minute, dextrorse, ovate with the apex rather acute, rimate; thin, transparent, of rather dark brown color with a slight greenish tinge; whorls $4\frac{1}{2}$ rather rapidly increasing, separated by a moderately deep suture, the last comparatively large, occupying over one-half of altitude, rounded; with a slight impression over the palatal fold; aperture well rounded, truncate, the margins slightly everted, the outer margin barely impressed at the auricle which is marked by a slight angle projecting over the level of the peristome; no callus in the palate; lamellæ and folds three or four, small, very short, of brownish color; the parietal, columellar and inferior palatal, and

sometimes there is also a superior palatal; surface with very fine irregular striæ, somewhat shining.

Size: alt. 1.5–1.6, diam. 1.1 mill., apert. alt. 0.6 mill.

Soft parts: they could not be fully examined. The dried body of a specimen accidentally crushed was softened up, and showed a considerable amount of dark pigment. Jaw yellow, rather narrow (means really: short), slightly curved, with a shallow indentation in the middle of the front edge, the lateral ends produced backward, in curves, like horns; the surface shows several (4–5) sharp, fold-like ribs on either side, of unequal sizes. Radula: rather broad, with 13 + C + 13 teeth, about seven being laterals, the outer three or four marginals, Nos. 8 and 9, about, marking the transition. The central tooth, with its plate almost square, is tricuspid, the medium cusp being about half the length of the plate, the outer ones much smaller; the first to third, or fourth laterals are bicuspid, but many of the teeth show, more or less distinctly, a minute third, intermediate tooth; the fourth or fifth, to eighth, are tricuspid with the cusps small and the mesodont at last hardly larger; from the tenth on, the cusps gradually disappear. Other parts of the body were not clearly distinguishable or not well defined.[1]

Habitat: Warwick, Rhode Island, collected by Mr. J. Francis Perry.

The present species resembles the low form of *Vertigo ventricosa* Mse. in the shape and size of the shell, but the formation of the aperture and its lamellæ and folds is quite different, the color is deeper and the surface less shining. From the other three described, typically three-toothed eastern vertigos: *tridentata* Wolf, *oscariana* Sterki and *parvula* Sterki, *V. Perryi* is also very different; in all of the three, the parietal lamellæ and palatal folds are much larger, longer, and of whitish color; the aperture is higher than wide; the shells are more elevated and of lighter color.

A new Vertigo from New England certainly is a surprise, and it is the more remarkable for being of a type rather different from all our other Eastern species. No doubt careful search will bring it to light from other localities. I take pleasure in naming the species in honor of its discoverer.

[1] In what appeared to be the mantle, or the pulmonary cavity, there was a small, evidently parasitic, worm, coiled up, the larva of a nematode, as it seemed.

SHELL COLLECTING ON THE MOSQUITO COAST OF NICARAGUA.—IV.

BY W. H. FLUCK.

Strombus bituberculatus Lam. Man of War Keys. Common.

Cypræa exanthema L. Same locality. A common shell on all the keys, including Great and Little Corn Island.

Dolium perdix L. Same locality.

Pyrula papyratia Say. Four dead shells on the beach near the mouth of the Wawa river.

Polinices brunnea Link. Wounta Haulover. Abundant.

Polinices lactea Guilding. Man of War Keys. Plentiful.

Natica maroccana Dillw. Wounta Haulover. Abundant.

Crepidula plana Say. Beach, north of Wawa river. One specimen.

Crepidula convexa Say. Beach, Wounta Haulover. Abundant.

Janthina sp? Although I tramped the beach nearly every evening for four years I found but two of these shells, but they were perfect, living specimens.

Vermicularia spirata Phil. Walpa Siksa. One shell.

Litorina lineata Phil. On the rock at Walpa Siksa. Plentiful in the dry season when no fresh water from the river entering the sea near the rocks disturbs them. Shells rather small, carinate and distinctly marked with the characteristic zigzag lines. I also have ten specimens from the Man of War Keys which are larger, less carinate and not so distinctly marked.

Litorina columellaris D'Orb. Wounta Haulover and everywhere on the beach along the whole coast. Invariably attached to stranded logs and pieces of wreckage. It often hollows out a pocket for itself in the decaying wood. This is the commonest litorine on the whole coast of Nicaragua.

Litorina angulifera Lam. This large and beautiful litorine is found along all the lagoons and rivers, hanging to mangroves beneath the surface of the water or not many feet above it. Specimens from Karata and Wounta. I never found it along the sea nor in fresh water up the rivers. It seems to prefer the brackish water "inside" not far from the sea. Very abundant.

Tectarius muricatus L. Man of War Keys. Plentiful.

Cerithium literatum Born. King's Keys. Abundant.

Planaxis nucleus Wood. King's Keys. Plentiful.

Pachycheilus corvinus Morel. Tungla river, near Quiquina, Nic. A common shell in all the rivers beyond the influence of the salt water. Dr. Pilsbry identified this shell for me, but Mr. Ancey, who received some of my shells from Mr. Shackleford, of Clitheroe, Eng., wrote me that my shells "differ from the true *P. corvinus* from Guatemala, named by the author himself." It was my intention to collect more of these shells, in order to supply my friends, but whenever I made preparation for a shell-collecting trip, some duty turned up and prevented me. At my request an Indian brought me about 100 specimens, and at first sight of them my heart rejoiced, but when I discovered that he had perforated the body-whorl of each, I rejected them in the hope of some day having opportunity to collect for myself. That time never came. The Indian's idea of shell collecting was limited to eating the inside and using the shells as beads! What an opportunity that would have been for lady shell-collectors!

Ampullaria reflexa Swn. Wounta. Found on the beach after heavy floods, just south of the river mouth at that place. Where they came from I do not know, presumably from "up the river." One had a perfect operculum, although a dead shell.

Nerita peleronta L.

Nerita versicolor Lam.

Both these forms from King's Keys and Man of War Keys. Much larger and more beautiful than those I have from the West Indies. A common article of food among the Indians, in turtle-spearing season, when they spend much time on the keys.

Nerita tessellata Gmel. Man of War Keys. Abundant.

Nerita praecognita C. B. Ads. Same locality. One specimen.

Nerita fulgurans Gmel. Walpa Siksa. On the rocks. Large. Not plentiful.

Neritina lineata Lam.

Neritina lineata var. *reticulata* C. & J. Common in Bluefields lagoon and in all the other lagoons and rivers as far up as the brackish water extends. The variety *reticulata* is by far the commoner of the two, only one in about forty being *lineata*. *Reticulata* averages larger, too. These shells are found on submerged mangrove roots and logs, or on the muddy bottom itself. The "tingnis," or channels, peculiar to the Mosquito Coast are its favorite haunts. It never ventures far from the water.

Neritina virginea L. On rocks and stones at the water's edge, inside the harbor, near the government wharf at Bluefields Bluff. As I made annual trips to Bluefields from my station at Wounta Haulover, I searched this spot and turned over the stones in April of 1899, 1900 and 1901, but saw none of these shells until May 5, 1902, when I found them in large quantities. The spot is about 200 yards from the sea, but in the rainy season is washed with fresh water for weeks. Have these shells been brought to Nicaragua by schooners from Grand Cayman or by fruit steamers from other ports? The shell is small, being about the size of *Neritina pupa* L., very uniform in its dark color and modest marking. It is very unlike the *N. virginea* I have seen from the West Indies.

Astralium cælatum Gmel. Man of War Keys. A very abundant shell on and about all the keys. An article of food among the Indians.

Astralium americanum Gmel. Same locality. Plentiful, but not as numerous as *caelatum*.

The Indians use the opercula of these shells for divination. By pouring strong banana vinegar over an operculum, the lime is eaten and gas liberated. This causes the operculum to "dance" about in one direction or another and in that way they find out the particular thing they want to know. No amount of explanation was able to convince them of their foolishness.

Turbo filosus Fischer. Man of War Keys. I found only two or three dead shells.

(*To be continued.*)

LIST OF WISCONSIN SHELLS.

BY GEORGE HALCOTT CHADWICK.

The following shells were collected in the summer of 1902 with the active assistance of the members of the Wisconsin Natural History Society, through whose bulletins a more complete annotated list will shortly be published. A thorough survey of the State is contemplated by the Society, for which this list will constitute a beginning. The specimens listed are all in the Milwaukee Public Museum.

A. Land Shells.

Helicina occulta, Say. Whitefish Bay.
Helix pomatia, Müll. Milwaukee, teste P. Wells.
Vallonia pulchella, Müll. Milwaukee. Common.
Polygyra profunda, Say. Milwaukee and vicinity; Crystal Lake.
Polygyra albolabris, Say. Whitefish Bay; Wauwatosa. Scarce.
Polygyra multilineata, Say. Milwaukee and vic. Scarce.
Polygyra thyroides, Say. Milwaukee and vic. Scarce.
Polygyra hirsuta, Say. Milwaukee; Mishicot, Manitowoc Co.
Polygyra monodon, Rack. Milwaukee and vicinity.
Polygyra monodon fraterna, Say. Milwaukee and vicinity.
Strobilops, cf. *virgo*, Pils. Milwaukee and vic.; Mishicot.
Pupoides marginatus, Say. Kenosha.
Bifidaria armifera, Say. Vicinity of Milwaukee.
Bifidaria contracta, Say. Vicinity of Milwaukee.
Bifidaria corticaria, Say. Wauwatosa.
Bifidaria curvidens, Sterki. Wauwatosa.
Bifidaria pentodon, Say. Vicinity of Milwaukee.
Vertigo milium, Gould. Near Milwaukee.
Vertigo ovata, Say. Near Milwaukee.
Cochlicopa lubrica, Müll. Vicinity of Milwaukee.
Vitrina limpida, Gould. Milwaukee. Rare.
Vitrea cellaria, Müll. Greenhouse, Milwaukee.
Vitrea draparnaldi, Beck. Greenhouses. Common.
Vitrea hammonis, Ström. Vicinity of Milwaukee.
Vitrea indentata, Say. Vicinity of Milwaukee.
Euconulus fulvus, Müll. 1 specimen.
Zonitoides nitidus, Müll. Milwaukee. Common.
Zonitoides arboreus, Say. Vicinity of Milwaukee; Mishicot.
Zonitoides minusculus, Binn. Vicinity of Milwaukee.
Limax maximus, Linn. Greenhouses, Milwaukee.
Limax flavus, Linn. Greenhouses, Milwaukee.
Agriolimax agrestis, Linn. Abundant about Milwaukee.
Agriolimax campestris, Binn. Milwaukee and vic.
Philomycus dorsalis, Binn. Whitefish Bay.
Pyramidula alternata, Say. Very common about Milwaukee; Mishicot.
Pyramidula perspectiva, Say. Whitefish Bay. 1 shell.
Pyramidula striatella, Anth. Milwaukee and vic. Common.

Pyramidula striatella catskillensis, Pils. Wauwatosa; Mishicot.
Helicodiscus lineatus, Say. Vicinity of Milwaukee.
Punctum pygmaeum, Drap.? Whitefish Bay.
Succinea retusa, Lea. Vicinity of Milwaukee.
Succinea ovalis, Say. Vicinity of Milwaukee. Abundant.
Succinea ovalis, cf. *totteniana*, Lea. Vic. of Milwaukee.
Succinea avara, Say. Vicinity of Milwaukee.

B. Unionidæ.

Lampsilis ventricosus, Barnes. Milwaukee River; Clear Water Lake, Oneida Co.; Lake Winnebago.

Lampsilis luteolus, Lam. Milwaukee River; Okauchee Lake, Golden Lake and Fox River, Waukesha Co.; Clear Water Lake, Oneida Co.; Boom, Winnebago Co.; Two Rivers, Manitowoc Co.; Lake Winnebago; ? ancient shell heaps at Winneconne, Winnebago Co.

Lampsilis superiorensis, Marsh. ? Two Rivers, Manitowoc Co.

Lampsilis ligamentinus, Lam. Milwaukee River; Fox River, Waukesha Co.; Clear Water Lake, Oneida Co.; ? Winnebago Lake at Menasha.

Lampsilis rectus, Lam. Fox River, near Big Bend, Waukesha Co. (pathologic).

Lampsilis iris, Lea. Milwaukee River at Milwaukee.

Lampsilis ellipsiformis, Conrad. Milwaukee River; Fox River, Waukesha Co.; Hika, Manitowoc Co.

Lampsilis alatus, Say. Lake Winnebago at Menasha; Two Rivers, Manitowoc Co.

Lampsilis gracilis, Barnes. Fox River and Lake Winnebago at Menasha; Boom, Winnebago Co.

Plagiola donaciformis, Lea. Kinnikinnick River, Milwaukee.

Strophitus edentulus, Say. Milwaukee and Kinnikinnick Rivers; Hika, Manitowoc Co.

Anodonta cataracta, ? Say. Maple Lake, Oneida Co.; Golden Lake, Waukesha Co.

Anodonta imbecilis, Say. North shore of Lake Winnebago (juv.).

Anodonta grandis, Say. Milwaukee River; Wauwatosa; Fox River, Okauchee Lake and Golden Lake, Waukesha Co.; Two Rivers, Manitowoc Co.; Winnebago Lake at Menasha; Maple Lake, Oneida Co.

Anodontoides ferussacianus, Lea. Milwaukee and Root rivers, Milwaukee Co.; Jambo Creek, Manitowoc Co.

Symphynota compressa, Lea. Jambo Creek, Manitowoc Co.

Symphynota costata, Raf. Milwaukee River.

Symphynota complanata, Barnes. Milwaukee River; Two Rivers, Manitowoc Co.

Alasmidonta calceola, Lea. Lake Michigan, Milwaukee; Jambo Creek, Manitowoc Co.

Alasmidonta marginata, Say (*truncata*, B. H. Wr.). Milwaukee River.

Unio gibbosus, Barnes. Milwaukee River; Fox River, Waukesha Co.; Two Rivers and Hika, Manitowoc Co.; Lake Winnebago; ancient shell heaps at Winneconne, Winnebago Co.

Quadrula undulata, Barnes. Fox River, Waukesha Co.; Two Rivers, Manitowoc Co.; Clear Water Lake Creek, Oneida Co.; ancient shell heaps, Winneconne, Winnebago Co.

Quadrula pustulosa, Lea. Ancient shell heaps at Winneconne.

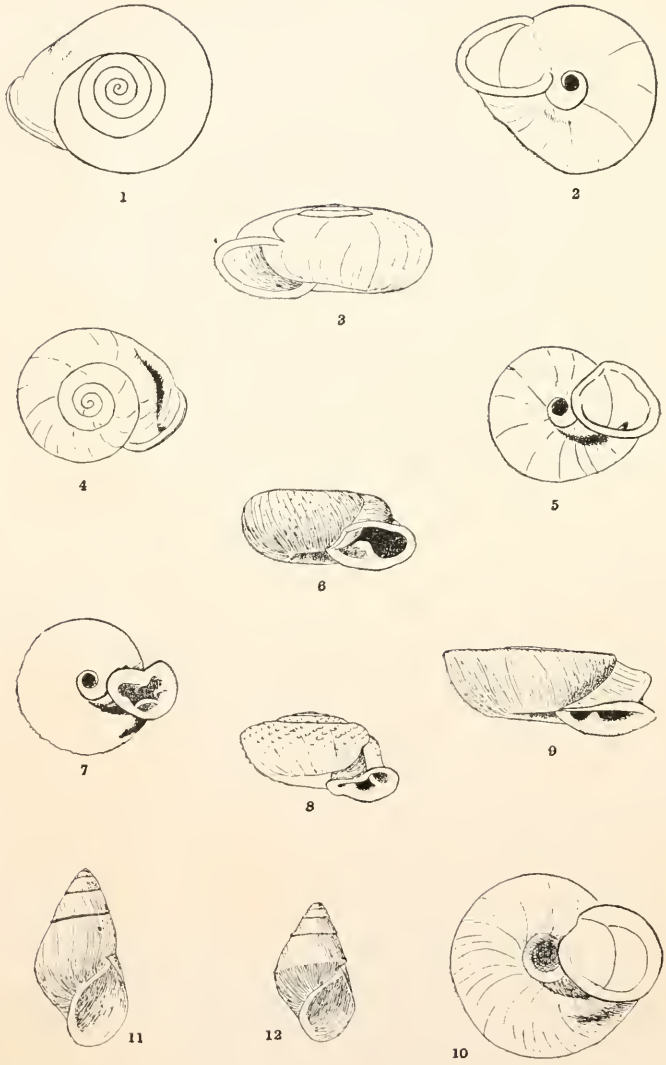
Quadrula rubiginosa, Lea. Milwaukee River; Two Rivers, Manitowoc Co.; Clear Water Lake Creek, Oneida Co.

Quadrula trigona, Lea ? Milwaukee River at Lindwurm.

A list of the *Limnæidæ*, *Sphæriidæ* and other fresh-water shells will be given in a future number.

PUBLICATIONS RECEIVED.

Descriptions of Indian and Burmese Land Shells referred to the genera *Macrochlamys*, *Bensonia Taphrospira* (gen. nov.), *Microcystina*, *Euplecta*, and *Polita*. By W. T. Blanford (Proc. Zoöl. Soc., Lond., 1904, pub. Apr. 18, 1905). Eighteen new species are described, and the new genus *Taphrospira* is erected for *Macrochlamys*-like snails with a trench or gutter bordering the suture outwardly. Four species are referred to this group: *T. convallata* Bens., *T. bathycharax* 'Bens.' Fult., T. *compluvialis* Blf. and *T. excavata* n. sp., the last two being figured. This is an unusually well-marked group for the *Zonitidæ*, quite deserving recognition in nomenclature, though differing from *Macrochlamys* only in the sutural gutter. The soft anatomy is unknown. To the above list should be added *Macrochlamys diadema* Dall, described in a former number of this journal.—H. A. P.



STEGODERA, MOELLENDORFFIA AND GONIOBASIS.

The Nautilus.

Vol. XIX. OCTOBER, 1905. No. 6.

DESCRIPTION OF A NEW SPECIES OF GONIOBASIS, FROM BRITISH COLUMBIA.

BY J. F. WHITEAVES.

Goniobasis Columbiensis sp. nov. Plate 2, figs. 11, 12.

Shell small (for the genus), apparently not exceeding fifteen millimetres in length, elongate conical and about twice as long as wide, spire rather short, a little shorter than the outer whorl, as viewed dorsally. Whorls actually five or six, but probably seven when perfect, the apex being always eroded; those of the spire obliquely compressed, the later ones thereof encircled with one to three very small spiral ridges or keels in some immature specimens, but smooth in full-grown ones. Outer whorl moderately convex, faintly and spirally angulate at the midlength in the immature stage but rounded in the adult, its lower or anterior portion always narrowing rather abruptly; sutural line impressed. Aperture subovate, longer than wide, acutely pointed posteriorly, produced and somewhat effuse but narrowly rounded in front, almost equal to the spire in length; outer lip thin and simple.

Surface of full-grown specimens almost smooth, and marked only with very numerous and closely disposed striæ that are parallel with the outer lip and so minute as not to be visible without the aid of a lens; also with one or two distant lines of growth that mark the position of previous lips.

Epidermis uniformly brownish or greenish-brown, without darker bands; aperture and inner surface of the last volution a lustrous

polished white, or with a very small, pale-purplish spot or stain on the columella posteriorly.

Operculum and animal not preserved.

Headwaters of the Columbia River, at Upper Columbia Lake, in the East Kootenay District of British Columbia, J. B. Tyrrell, 1883: thirty-seven fresh and living specimens, all of which are in the Museum of the Geological Survey of Canada at Ottawa.

This species seems to differ from the eastern *G. livescens* in its much smaller size, fewer whorls, and proportionately shorter spire; also in the color of its epidermis and aperture. It is believed to be the first non-plicate *Goniobasis*, of the type of *G. livescens*, that has been found in the Pacific drainage system.

Ottawa, August 15, 1905.

NOTES ON THE SEMI-FOSSIL SHELLS OF POSEY COUNTY, INDIANA.

BY L. E. DANIELS.

Ages ago the Wabash River, which forms the western boundary of Posey County, Indiana—the extreme southwestern county of the State—was much wider than now, as indicated by the range of bluffs which border and run parallel with the bottom-lands of the present river, which, in some places are six miles in width. These bluffs or hills are in most cases one hundred or more feet above the level of the bottom-land, and many of them contain deposits of marl from one to twenty feet in depth.

During the summers of 1901–4, while working for the Indiana State Geological Survey, I had an opportunity of examining several of the deposits, particularly at New Harmony and Grand Chain, Posey County, and collected from them several species of recent shells in a fossil state. The marl is usually covered with two or more feet of soil, and the shells occur from six to fifteen feet below the surface, being the more plentiful from the middle to the bottom of the marl deposit.

Polygyra monodon (Rack.)—the shell formerly called *leai* Ward—is abundant, but I have been unable to find a single living specimen here, and nowhere else in the State except on the marshes bordering several of the lakes in the northern part of the State, where it is

plentiful. It seems strange that a species once so abundant here should have entirely disappeared.

Following is a list of the species I have taken from the marl beds at New Harmony and Grand Chain:

Helicina occulta Say. Abundant.
Vallonia pulchella (Müll.).
Polygyra multilineata (Say).
Polygyra hirsuta (Say). Abundant.
Polygyra monodon (Rack.). Abundant.
Polygyra monodon fraterna (Say). Abundant.
Strobilops labyrinthicus (Say).
Strobilops affinis Pils.
Pupoides marginatus (Say). Common.
Bifidaria armifera Say.
Bifidaria contracta Say.
Circinaria concava (Say).
Omphalina inornata (Say).
Vitrea hammonis (Strom.).
Vitrea wheatleyi (Bland).
Euconulus fulvus (Müll.).
Zonitoides nitidus (Müll.).
Zonitoides arboreus (Say).
Gastrodonta ligera (Say).
Pyramidula alternata (Say).
Pyramidula perspectiva (Say).
Pyramidula striatella (Anth.).
Helicodiscus lineatus (Say).
Succinea retusa Lea.
Succinea avara Say.
Pomatiopsis lapidaria Say. Abundant.

NOTES ON MOELLENDORFFIA AND STEGODERA.

BY HENRY A. PILSBRY.

In southeastern China, Tonquin and the neighboring region, there is a group of curious Helices with reflexed lip, toothed aperture or plicate throat, and granose, often hairy surface. The systematic re-

lations of these snails are still uncertain. No member of the series has been dissected.

One of the first forms described was *Stegodera angusticollis* Martens (pl. 2, fig. 1, 2, 3), a sinistral snail from the Yangtse valley, with the last whorl distorted, making the throat very narrow. It has not before been noticed that there is a weak and shallow groove on the upper part of the last whorl (indicated in fig. 1), and another one, very weak and shallow, on the base. These vestigeal furrows, which would scarcely be noticed, evidently represent structures far better developed in the following species.

Helix triscalpta Martens, type of Ancey's group *Traumatophora*, is shaped like *Stegodera*, but has a regular coil, and is dextral. There are three furrows in the latter part of the last whorl, marked inside by irregular lamellæ. The texture and granose sculpture are like *Stegodera*.

Helix horrida Pfr. and its allies are quite different. The spire is sunken, as in *Chloritis*, the peristome continued in a cord across the parietal wall, and the last whorl has two deep furrows, one basal, the other above the periphery. This and all the preceding have the apical whorl smooth and glossy. (See pl. 2, figs. 4–6.)

Another series has the apical whorl granulated. There are two or three furrows outside, with corresponding prominences within. *Helix trisinuata* type of *Moellendorffia* Ancey, is typical of this group (pl. 2, figs. 7, 8).

The absence of any internal lamellæ or barriers on the parietal wall differentiate all of the above from *Plectopylis* and *Corilla*, while the granose surface, external furrows, etc., indicate that the various members are related to one another. The tendency to have two external pits or furrows in definite positions shows a great likeness to certain forms of *Chloritis*, and the very closely related group *Planispira*, such as *C. bifoveata* Bs., *P. endoptycha* Mts., *porcellana* Grat., *infracta* Marts., etc.[1] The correspondence is so close that I have now little doubt that this Chinese series of Helices is closely related to the genus *Chloritis*, though the full demonstration awaits an examination of the soft anatomy. Pending this, I would suggest the following classification of the species:

[1] Mr. Sykes has proposed a section *Vulnus* for these pitted Planispiras.—J. of Malak., 1904, p. 88.

I. Peristome continuous, free, or continued as a thick cord across the parietal wall; aperture subtriangular, squarish or subcircular, the throat with two or three plicæ.

Genus MOELLENDORFFIA Anc.

1. Apical whorl granulated; parietal callus free and erect or shortly adnate.

a. Spire convex or low-conic; surface coarsely warty; periphery angular or rounded, both sulci below it; peristome continuous, the parietal callus free and erect, bearing a rounded tooth. There is often a small sulcus above the principal outer one.

Subgenus *Moellendorffia* s. str., Anc.

a[1]. Spire flat, the periphery carinate, two sulci, one subperipheral, the other basal below it. Aperture subcircular, the adnate parietal callus very short, not toothed.

Subgenus *Moellendorffiella* Pils.

2. Apical whorl smooth; parietal callus adnate, thickened at the edge; spire more or less concave; aperture heart-shaped, subtriangular or squarish; edge of the parietal callus thickened, cord-like. Surface minutely granose between larger warts which sometimes bear hairs. Typically with a basal and a superperipheral furrow behind the aperture, with corresponding prominences inside, but these may be reduced to indistinct vestiges. Subgenus *Trihelix* Anc.

II. Peristome widely interrupted, the parietal callus thin throughout; aperture rounded-lunate; periphery rounded and spire convex in known forms; apical whorl smooth.

a. Sinistral, last whorl distorted; external sulci vestigeal; no internal lamellæ. Genus STEGODERA Martens.

a[1]. Dextral, regular; three external sulci and internal plicæ.

Subgenus *Traumatophora* Anc.

The species now known are as follows:

Moellendorffia eastlakeana (Mlldff.), China.

Moellendorffia hensaniensis (Gredl.), China.

Moellendorffia trisinuata (Marts.), China.

Moellendorffia trisinuata sculptilis (Mlldff.), China. (Pl. 2, figs. 7, 8.)

Moellendorffia loxotata (Mab.). Tonquin.

Moellendorffia spurca (Bav. & Dautz.). Indo-China.

Moellendorffia spurca deflexa (Mlldff.). Indo-China.
Moellendorffia messageri (Bav. & Dautz.). "
Moellendorffia callitricha (Bav. & Dautz.). "
Moellendorffia (Moellendorffiella) erdmanni (S. & B.), China. (Pl. 2, figs. 9, 10.)
Moellendorffia (Trihelix) horrida (Pfr.). Cambodia.
Moellendorffia (Trihelix) biscalpta (Hde.), China.
Moellendorffia (Trihelix) faberiana (Mlldff.), China.
Moellendorffia (Trihelix) hiraseana Pils., Formosa. (Pl. 2, figs. 4, 5, 6.)
Moellendorffia (Trihelix) eucharistus (Pils.), Ryukyu Is.
Moellendorffia (Trihelix) eucharistus tokunoensis Pils. & Hir.
Moellendorffia (Trihelix) eucharistus diminuta Pils. & Hir.
Stegodera angusticollis (Marts.), China. (Pl. 2, figs. 1, 2, 3.)
Stegodera (Traumatophora) triscalpta (Marts.), China.

Moellendorffia (Trihelix) hiraseana n. sp. Plate 2, figs. 4, 5, 6.

Shell planorboid, umbilicate, the umbilicus about one-fifth the diameter of the shell, thin but moderately strong, brown (the exact color not known, as the specimens found are dead). Sculpture of very distinct minute granules, close but not regularly arranged, and on the last whorl and a half, comparatively large oblong low tubercles, rather widely spaced, and standing in somewhat irregular oblique rows. Spire slightly sunken in the middle. Whorls $4\frac{1}{2}$, convex, the last more than twice the width of the preceding, convex above and below, rounded peripherally, having a deep obliquely ascending sulcus above the periphery on its last fourth, shallower as it approaches the lip, and another on the base, tangentially passing out from the umbilicus. Aperture very oblique, heart-shaped, obstructed within by two strong plicæ representing the external furrows, the basal plica standing transversely, the peripheral one entering. Peristome well reflexed, whitish, the margins connected by a raised callous parietal cord; upper lip arcuate and tapering near the upper insertion, then straightened and sloping, with a very slight prominence within where the sulcus terminates; basal lip but slightly arcuate.

Alt. 7.7, diam. 18 mm.; length from lip-edge to rear end of upper sulcus 9 mm.

Hotawa, Taiwan [Formosa]. Type no. 89999, A. N. S. P., from no. 1406 of Mr. Hirase's collection.

Two specimens of this fine species were obtained. It is closely related to *biscalpta* (Heude) and *faberiana* (Mlldff.) of China. The former is a somewhat larger shell, in which the supraperipheral sulcus terminates at the lip in a downward projecting prominence, causing the upper margin of the lip to appear composed of two small arches, a structure not seen in *M. hirasei*. The spire in *M. biscalpta* is decidedly wider than in the Formosan shell. *M. faberiana* (Mlldff.) has not been figured. It is the size of *M. hirasei*, but differs by the shape of the last whorl, which is flat, obtusely angulated above, and obtusely angular around the umbilicus, by the absence of a parietal callus, sinuous outer lip, etc. It also seems to differ in sculpture and various other features. *M. hiraseana* probably will be found to bear hairs on the larger warts when in fresh condition.

A NEW SUBSPECIES OF POLYGYRA FERRISSI.

BY JAMES H. FERRISS.

Happening to look over my cabinet series of *P. ferrissi* by daylight, I noticed that some shells from Balsam Mountain, Swain Co., N. C., differed from *ferrissi* in several points, especially the minute sculpture, and I believe them to be a new subspecies.

Polygyra ferrissi sericea n. subsp.

The shell has $5\frac{1}{3}$ to $5\frac{1}{2}$ whorls, the inner ones but slightly paler than the outer, with but the slightest trace of punctation. The last whorl has perceptibly closer striation than *P. ferrissi*, is less glossy, and is covered with a weak, very minute granulation in the interstices between striæ; there is also a slight, fine malleation or indentation; the general effect being that of a dull silk. The color is rich reddish brown, with a slight olive tint. The lip is broad and flat, a little turned back. The outer edge is dark, the inner rim white. There is a very small parietal denticle, smaller than in *P. ferrissi*. Alt. 12.7 to 13, diam. 23 mm.

Balsam Mountain, Swain County, N. C.

THE SNAILS OF NEW MEXICO AND ARIZONA.

T. D. A. COCKERELL.

Mollusca of the Southwestern States. 1. Urocoptidæ; Helicidæ of Arizona and New Mexico. By H. A. Pilsbry. (Proc. Acad. Nat. Sci., Phila., March, 1905.)

Several years ago I was walking at night in the streets of Albuquerque, N. M., looking for a building where a certain meeting was to be held. Accosting the first person I met, I asked the way. The stranger at once said that he was going to the same meeting, and we walked together. I do not know how it was, but through some inevitable necessity, the conversation soon led up to snails. My companion was from the Pacific coast; his name was Ashmun; he was interested in snails; did I suppose he could find any in New Mexico? Thus I had run across the only person in New Mexico, except myself, who cared anything about the mollusca. The information I gave him was not particularly encouraging; he was not likely to find much, but there were some little *Pupidæ* and other miscellanea in the debris on the banks of the Rio Grande.

The next time I met Mr. Ashmun was in the train between Las Cruces and Albuquerque. His first remark was, "I have found three new *Polygyras!*" I well remember my almost incredulous astonishment; I thought I knew there were no such things in that region; for even the Santa Fé Cañon records had become semi-mythical in the absence of recent confirmation.

Thus the corner of the veil was lifted; but how little we then realized that Arizona and New Mexico contained a whole new snail-fauna, including new genera of many species, large and varied in form! Fifteen years ago, the man who should have predicted the discovery of a very distinct genus of comparative large snails, with 26 different species and subspecies, within the borders of New Mexico and Arizona, would have been considered a veritable Munchausen; to-day we are prepared for almost anything, and humbly confess that we scarcely begin to know the fauna of the Southwest.

Astonishing as Mr. Ashmun's discoveries were, it remained for Mr. J. H. Ferriss to reveal even more wonderful forms. In 1902 and again in 1904, he visited the Chiricahua and Huachuca mountains in southern Arizona. The results of these journeys, together with the accumulated fruits of other investigations, are presented by

Dr. Pilsbry in the paper before us, so far as they relate to the *Urocoptidæ* and *Helicidæ*. A second paper, on the small species, is to appear later.

The paper is full of detail and profusely illustrated, so that it practically covers the ground, so far as present knowledge will permit. It has the lucidity and precision which we have learned to expect in Dr. Pilsbry's writings, presenting the facts in such a manner that the reader can judge for himself, whether he will agree with the conclusions reached or not.

In the *Urocoptidæ*, the genera *Holospira* and *Microceramus* are described. The latter includes *M. texanus* (Pils.), of Texas, but does not enter New Mexico or Arizona. *Holospira* has a species confined to Texas, one common to Texas and adjacent New Mexico, five apparently peculiar to New Mexico, and four only known from Arizona. They seem to be often confined to a single range, two species being sometimes found living together. Four new ones are described: *H. ferrissi* from the Huachuca Mts., *H. cionella* from Fort Bowie, Ariz., *H. regis* Pils. and Ckll., from near Kingston, N. M., and *H. chiricahuana* from the Chiricahua Mts.

The Helicidæ of Arizona and New Mexico include five genera: *Ashmunella*, *Sonorella*, *Oreohelix*, *Polygyra* and *Thysanophora*. The last is to be treated later on, and *Polygyra* is dismissed with the remark that it just enters New Mexico, one species—*P. texasiana*—having been found in the Pecos Valley. It is worth while to note here that these Polygyras were collected by Professor Tinsley, who subsequently took me to the locality where they occur. They exist exclusively, so far as I could learn, in a bed of white marl close to the Pecos river, and they are to be regarded as pleistocene fossils. It is quite probable that *Polygyra* has been long extinct in New Mexico; but if it still survives there the fact remains to be discovered. The fossil shell is probably worthy of a subspecific name, as it is not typical *texasiana*.

Incidentally, one may be excused for remarking that the pleistocene beds of the southwest urgently need investigation. They are abundant in New Mexico, at least, and there is no doubt that they will throw much light on the past history of the snails of that region. Unfortunately, it is usually impossible to form any good estimate of their age, for shells are well preserved in the dry soil, and specimens ten thousand years old may not look materially different from

weathered shells which flourished ten years ago. When mammalian remains can be found with the shells, of course they afford valuable clues.

The account of *Ashmunella* begins with an interesting general discussion occupying four pages, in the course of which it is argued, apparently on valid grounds, that the ancestor of all the forms had a tridentate aperture. It is to be noted that this is the case with *A. thomsoniana pecosensis*, the most ancient form yet known. The toothless forms have arisen independently in several localities, and have come to resemble each other so much that they are only separated readily by those intimately acquainted with the genus, or in some cases by the aid of the anatomy. In this connection I may note that I once found at Pecos, N. M., a toothless shell which was plainly an individual variation of the *thomsoniana* series; but anyone could have taken it for *A. ashmuni*. Recalling this specimen, and more particularly on geographical grounds, I will venture to prophesy that when the anatomy of *A. ashmuni* becomes known, it will be seen to be related to the *thomsoniana* series, rather than to the *rhyssa* series, where Dr. Pilsbry provisionally places it.

The classification of the *Ashmunellas* is as follows:

(1.) Group of A. rhyssa. *A. rhyssa; rhyssa miorhyssa; r. hyporhyssa; r. townsendi; altissima; pseudodonta; p. capitanensis; ashmuni*; *a. robusta* (new name = the so-called *chiricahuana* of the Jemez Mts.).

(2.) Group of A. thomsoniana. *A. thomsoniana; t. porteræ; t. pecosensis*—the last a fossil.

(3.) Group of A. levettei. *A. levettei; l. angigyra* (new); *l. heterodonta* (new; extraordinarily variable); *l. proxima* (new); *fissidens* (new); *duplicidens* (new); *angulata* (new); *ferrissi* (new, most extraordinary, acutely carinate, with the keel continued up the spire, projecting above the sutures); *walkeri; mearnsi.*

(4.) Group of A. esuritor. *A. esuritor* (new; aperture toothless, anatomy peculiar).

(5.) Group of A. chiricahuana. *A. chiricahuana; c. mogollonensis* (new).

(6.) Group of A. metamorphosa. *A. metamorphosa* (new; shell like *chiricahuana*, anatomy quite different.)

The account of *Sonorella* is not so exhaustive, because the genus has so recently been treated in detail by Mr. Bartsch. The follow-

ing are proposed as new: *S. hachitana bowiensis*, *S. granulatissima parva*, *S. g. latior*, *S. virilis* (looks like a variety of *hachitana*, but anatomy peculiar), *S. v. circumstriata*, *S. v. huachucana*.

Oreohelix is carefully defined, but only the species of Arizona and New Mexico are treated, and not even all of those. The very variable series grouped under *O. strigosa huachucana* is fully described and illustrated. The new forms are *O. strigosa socorroensis* (allied to *metcalfei*), *O. barbata* (very remarkable, the adult with an epidermal fringe), *O. yavapai*, *O. y. neomexicana* (this species and subspecies separated mainly on the anatomy; the *neomexicana* has been reported heretofore as *hemphilli*, which it much resembles), and *O. chiricahuana*. The last, along with *O. clappi* Ferriss and *O. avalonensis* Hemphill, goes in a new subgenus, named *Radiocentrum*, distinct by the smaller number and the sculpture of the embryonic whorls, and the somewhat modified genitalia.

I wish to call attention to a few apparent peculiarities of distribution, which should be confirmed or disproved by future observers:

(1.) On the east side of the Rio Grande, *Oreohelix* appears to get no further south than the Sandia Mountains. It is totally unknown in the Organs, Sierra Blanca, etc. On the west side of the river it goes nearly to the Mexican boundary, at least.

(2.) *Sonorella* gets as far east as the Organ Mts., but I have not seen it from Sierra Blanca or the Sacramentos; nor does it seem to range northward even as far as the Sandias.

(3.) The Organ Mts. mark the eastern limit of the *levettei* group of *Ashmunella*, the species found there being *mearnsi*. One has only to cross the valley to the Sacramentos to meet with the very different *rhyssa* series.

PUBLICATIONS RECEIVED.

Antarctic Nudibranchs.—Sir Charles Eliot has just published in the Transactions of the Royal Society of Edinburgh a very interesting paper on the Nudibranchiata of the Scottish National Antarctic Expedition. In the preface he remarks on the absence or extreme rarity of Dorids in the Antarctic, while in the tropics Dorids are greatly more abundant than Aeolids. This seems the more singular from the fact that the Dorids are tough and well-protected animals for the most part, while the Aeolids would seem too delicate for the stormy and cold seas (often below 30° Fahr.) of the extreme

south. Possibly the prevalence of other forms of life, including enemies of Nudibranchs, in the tropics may have something to do with it, especially since so many tropical Dorids (*Chromodoris*) show what seem to be warning colors, and are probably inedible.

The species obtained by the expedition in the southern seas were only five in number, and two of these were not in the Antarctic. Nevertheless all these except one proved new, and two are made the types of new genera. The first of these genera, *Notaeolidia*, is based on an animal nearly five inches long, obtained at the South Orkneys. This is so distinct that Sir C. Eliot believes it to represent a new family, standing between the Aeolidids proper and the Dendronotines. This would be a family in the sense of Bergh; a subfamily of Alder and Hancock. The Notaeolidiidæ (or Notaeolidinæ) are defined thus to include a single genus and these species:

"Large animals of Aeolidiform appearance. Oral tentacles large rhinophores perfoliate without sheaths. Foot rounded and grooved in front. Dorsal margin undulated, and bearing one or more rows of close-set cerata. Jaws not denticulate. Radula consisting of a central tooth and four (rarely five) laterals on each side. Central tooth with a strong median cusp and side denticles; laterals denticulate on inner side. The liver forms a lobed, flocculent mass within the body cavity, and in the body walls a thick, spongy layer, from which rise the diverticula which enter the cerata. The hermaphrodite gland lies above the liver."

The other new genus is *Tritoniopsis*, based on a species (*T. brucci*) from Gough Island, 40° 20′ S. It differs from *Tritonia* principally in the dentition, the central tooth being narrow and pointed, not broad, and provided with accessory cusps. The outer laterals are much elongated.—T. D. A. C.

An Arrangement of the American Cyclostomatidæ with a Revision of the Nomenclature. By Wm. H. Dall. (Proc. Mal. Soc., London, vi, 208.) A new subgenus (*Parachondria*) of the genus *Chondropoma* is proposed, type, *C. fascia* Wood, Jamaica. Also a new genus *Opisthosiphon*, type, *Chondropoma bahamense* Shutt.

A new Chiton from the New England coast, by Wm. H. Dall. (Proc. Biol. Soc., Washington, xviii, 203.)

This new species, *Tonicella blaneyi*, was dredged by Mr. Dwight Blaney in 20 fathoms, off Ironbound Island, Frenchman's Bay, Maine. Including the deep-sea species, this makes twelve species of Chitons recorded on and off the New England coast.—C. W. J.

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DESCRIPTIONS OF TWO NEW FORMS OF POLYGYRA.

BY GEO. H. CLAPP.

Polygyra smithii n. sp. Plate III, figs. 1–4.[1]

Shell imperforate, depressed, thin, horn-color, densely covered with elevated epidermal processes, giving the shell a scaly appearance, the hairs following the weak growth lines; embryonic whorls sculptured with elongate granules; spire low, convex, rounded, sutures well impressed, whorls about $5\frac{1}{2}$; body-whorl obtusely carinated above the periphery in its first third; rounded, swollen and very deeply constricted back of the peristome, sharply descending in front; upper half of the aperture, viewed from the under side, forming a half circle; below the periphery almost straight, so that the whole effect is like a human ear; lip wide, white, concave above and flat below, at the periphery a wide, flat entering tooth, basal lip straight, slightly thickened on the upper margin; parietal wall bearing a large, high, very slightly curved tooth extending from the lip-tooth to the axis, a thin wash of whitish callus connecting the upper and lower ends of the lip.

Gr. diam. $16\frac{1}{2}$, lesser 14, alt. 10 mm.

Gr. diam. $15\frac{1}{2}$, lesser $13\frac{1}{2}$, alt. 9 mm.

Gr. diam. 15, lesser 13, alt. $8\frac{1}{2}$ mm.

Gr. diam. $14\frac{1}{2}$, lesser $12\frac{1}{2}$, alt. $8\frac{1}{4}$ mm.

Gr. diam. $13\frac{1}{2}$, lesser $11\frac{3}{4}$, alt. $7\frac{1}{2}$ mm.

The first and last measurements given are the extremes of a considerable series, the average size being about 15 mm.

Near the top of Monte Sano, at an altitude of about 1,600 feet, about 5 miles east of Huntsville, Ala., under large logs, piles of stones, etc.

[1] This plate will appear in a future number.

"Almost always it is on the ground or on the lower surface of a stone which rests on the ground. I have never seen the snail crawling abroad, even in wet weather. The shells are invariably covered with a dark deposit, which is removed with some difficulty." (H. H. S.)

Also found, but more rarely, on Smithers Mountain and near Gurley and Princeton.

Animals almost black, very shy in confinement, spending most of their time either half or completely buried in the earth.

This most interesting and strongly-marked species is another of Herbert H. Smith's finds, and I take great pleasure in naming it after him. While bearing a striking resemblance to an overgrown *P. inflecta*, it is readily separated by the character of the hairs and the absence of the basal lip-tooth; it is also close to *P. subpalliata*, but is apparently most closely related to *P. inflecta*.

Monte Sano is an outlier of the Cumberland Plateau, so that this may be considered a species of that most interesting faunal region.

Types No. 5388 of my collection and co-types in the collections of the Academy of Natural Sciences, Bryant Walker and T. H. Aldrich.

Polygyra inflecta approximans n. subsp. Plate III, fig. 6.

Differs from typical *inflecta* in the closely approximated lip teeth, the space between them measuring only about $\frac{1}{2}$ mm. in width, while in the typical form it measures 1 mm. and over. The aperture is also wider, in proportion to its length, and less rounded in front; body-whorl narrower at the aperture, not swollen back of the lip. In other characters like the type—whorls about $4\frac{1}{2}$.

A considerable proportion of the shells have the umbilicus partly open, and while this can hardly be considered a specific character the proportion is greater than in any lot of *inflecta* I have seen.

Greater diam. $7\frac{1}{2}$, lesser $6\frac{1}{2}$, alt. $4\frac{1}{4}$ mm.

Greater diam. 8, lesser 7, alt. 5 mm.

Greater diam. $8\frac{1}{2}$, lesser $7\frac{1}{2}$, alt. $4\frac{3}{4}$ mm.

Greater diam. $8\frac{3}{4}$, lesser $7\frac{3}{4}$, alt. 5 mm.

Marion, Ala., where it practically replaces the typical form as only four dead shells of the latter were found. Collected by Herbert H. Smith in May, 1905. A specimen of *P. inflecta* from Jackson, Ala., is figured for comparison, pl. 3, fig. 5.

Types No. 5389 of my collection and cotypes in the collections of the Academy of Natural Sciences, Bryant Walker and T. H. Aldrich.

ON SOME CYPRAEIDAE IN THE COLLECTION OF MR. D. W. FERGUSON, OF BROOKLYN, WITH DESCRIPTIONS OF SEVERAL NEW VARIETIES.

BY SLOMAN ROUS.

In this collection—which Mr. Ferguson kindly allowed me to inspect—the Cypraeidæ are especially interesting. There are several varieties that appear to me to have been not hitherto noticed, and some which, though not attaining varietal dignity, are well worthy of remark.

CYPRAEA HELVOLA var. APHRODITE, var. nov.

More pyriform and much wider than the type, and considerably depressed. Very pale yellowish-brown, sides slightly darker, again changing to the paler dorsal color on the base, the interstices of the teeth a full shade darker, back flecked with numerous small snow-white spots, and a few larger spots of a still pale brown, but darker than the ground color. Edges of base rather heavily thickened.

I am not sure that this shell may not claim specific rank, while it is close to *C. helvola*, the differences are many. Beside its pyriform shape the outer half of the base is about two and a half times wider between the aperture and outer edge than the opposite, and the teeth are prolonged almost half-way over this space, making them appear finer and more elegant than in *helvola*. The aperture is almost straight and narrower than the type. This is accentuated by the columellar lip being much less arcuated than is normally the case, so that the anterior portion of the lips are almost as close together as the posterior. Long. 27, lat. 20, alt. 14 mm. It is a very lovely shell and undoubtedly very rare. Hab. Sandwich Is., W. H. Pease.

A specimen of *C. arabica* is curiously marked. On the inner side of the dorsal line the pattern is normal, but on the outer side, while some of the white spots are irregular in shape, most of them are round and annulated with dark brown. The dorsal line is very crooked and would seem to indicate a malformation of the mantle.

There is also a specimen of *arabica* var. *eglantina* Duclos. Mr. J. Cosmo Melvill, in his description of this shell in his "Survey of the Genus Cypraea," says it is shining brown. All the specimens I have seen have been the color of Portland cement, and decidedly not brown.

CYPRAEA EXANTHEMA var. PUDICA, var. nov.

Shape normal, small, color very pale brown, with spots of gray-

white, minutely—almost microscopically—thickly irrorated all over with dots of still lighter color than the spots, and showing on them as well as the rest of the shell, thickly, minutely granulated at the extremties, and less thickly so over dorsal surface, sides smooth. Long. 55, lat. 36 mm.

Notwithstanding the dull coloring and that the granulation detracts somewhat from the lustre of the shell, it is still a very pretty and striking addition to the handsome suite of exanthema in the collection.

A dwarf *C. cervinetta* is a very pretty little shell of a dark umber-brown, with whitish spots and dorsal line down the centre of the back, base fawn color with faint brownish blotch and bright chocolate-brown teeth. Long. 31, lat. 17, alt. 13.5 mm.

In the suite of *C. lynx* is a very interesting example. It is longitudinally corrugated from one side to the other by lines of growth. The earlier lines are narrow, numerous striations running from the spire obliquely to the base in which they disappear; on the back they are parallel to the sides, only bending near the anterior extremity; on the outer side they become parallel to the edge of the base. From the earliest to the latest stage of growth the intervals between the striae gradually and regularly increase in width until those on the outer side are shallow sulci between sharp costulae, the width of the last sulcus being 3 mm. It is a young shell, probably waiting its last deposit of enamel, which would very likely obliterate the growth lines; as it is, it is a very beautiful illustration of shell-formation.

Another specimen of *lynx* is interesting for its size; it is adult, normal in every respect, except size. Long. 21, lat. 11.5 mm.

Cypræa vitellus var. fergusoni, var. nov.

Teeth, base and sides normal, dorsal line wide, lighter in color than the back, dorsal surface rather dark fulvous brown, obscurely banded with lighter shade and spotted with bluish-white or light lead-colored spots, which seem to solve themselves into rows of three or four in various directions, each spot surrounded by a narrow blackish ring; the spots at sides are not annulated. Long. 37, lat. 23, alt. 19 mm.

The difference between this and the type lies in the annulation of the spots and their disposition in short rows. It is fully developed though small in size. Loc. ?

Cypræa cruenta var. violacea, var. nov.

There are two specimens of *cruenta*, one typical in shape, the other stunted, broader, somewhat depressed, with the strong teeth of var. *coloba* Melvill, but each having a large, bright violet patch on the base. The brownish-violet spots on the sides are also unusually bright. I propose the above name for such specimens as possess the violet basal blotch.

Cypræa caput-serpentis var.

Base and sides normal, back almost pure white but very faintly tinged with blackish on which the snow-white spots are just perceptible, the brown of the sides merging a little into the white of the dorsum, showing a narrow border of the typical white spots; extremities of the usual smoky white. The white back accentuated by the dark sides is curiously suggestive of a bald head.

Another specimen of *caput-serpentis* has the dorsal surface a lighter brown than the sides, and sparsely spotted and blotched with whitish-brown.

There is also a dwarf specimen: Long. 20, lat. 13, alt. 10 mm.

Cypræa caurica var.

Back light yellowish-brown with three brown bands, rather profusely sprinkled with small brown spots. Base and sides creamy white, striated with fine pure white lines. Sides with a few large dark-brown purplish-shaded spots.

Cypræa isabella var. fulva, var. nov.

Uniform yellowish-brown, only very faintly tinged with orange at the extremities, base creamy-white.

Length 30½, diam. 16 mm. (Coll. Ferguson.)

Length 35, diam. 19 mm. (Coll. Acad. Nat. Sci.)

There is another specimen of *isabella* the same color but with the normal longitudinal black markings and orange extremities.

Cypræa carneola var. adonis, var. nov.

Base pure white, extending a little up the sides, above which the sides are light yellowish-brown, thickly irrorated with minute white spots. Dorsum whitish, banded with four faint orange bands. Sides thickened. Teeth yellow, turning to orange anteriorly. More pyriform in shape than typical *carneola*.

There is a diversity of opinion respecting this shell among our

local collectors, some considering it a variety of *C. arenosa*, and others *C. carneola* var. *propinqua* Garrett. I think it is closer to *carneola* than *arenosa*, but it differs from *propinqua* in having no violet ring and in the color of the teeth.

SHELL COLLECTING ON THE MOSQUITO COAST OF NICARAGUA.—V.

BY W. H. FLUCK.

Liotia cruentata Mühlf.

Omphalius viridulus Gmel.

Omphalius indusii Ch.

Livona pica Linn.

All from Man of War Keys. The last-named species is found by the dory-load, and is used as an article of food by the natives. When perfect, the shell is beautifully mottled with white and black, but most specimens from "the keys" are badly incrusted. The beautiful spiral operculum is a study in itself.

Fissuridea alternata Say. Wounta Haulover. I found about a dozen in four years, the locality being, I suppose, not rocky enough for them.

Subemarginula octoradiata Gmel. Man of War Keys.

Acmæa melanoleuca Gmel. King's Keys. A white variety.

Guppya biolleyi Mart. Rama Key. This little island is in the Bluefields lagoon, about 10 miles south of the town of Bluefields. The shell was found in the yard of the Moravian Mission.

Epiphragmothora coactiliata Fér. Weilawas Hill, near Wani, Nicaragua, near where the Ulli river and Wani river meet to form the Prinzapolka river.

Bulimulus corneus Sowb. Bluefields, in the garden of the Moravian Mission, among flags and other plants and under stones.

Macroceramus caracasensis Rve. Bluefields. Same locality and station.

Macroceramus concisus Morelet. Weilawas Hill, Wani, Nic.

Bifidaria sp.? Bluefields. Numerous. Clinging to stones. Dr. Dall has seen specimens, and says they much resemble *B. eyriesii* Drouet, of Venezuela, or *P. wolfii* Miller, of Ecuador, adding: "There are so many of these described that I don't dare attempt to name it, especially as our series of these species from the tropics is very incomplete."

Oxystyla princeps Brod. Near Kukallaya, in the plantation clearings of the Indians, along the Kukallaya river (sometimes called Wounta river). Quite numerous. I have one specimen that lacks the characteristic zigzag markings, being quite plain, except for the dark-brown spot at the very point of the blunt apex, together with a faint suggestion of some narrow brown bands on the whorls.

Subulina octona Linn. Bluefields, under stones and beneath foliage in damp places.

Subulina mimosarum Orb. Bluefields, Rama Key, Wounta Haulover, Kukallaya. Under stones, wood, leaves, in damp places.

Succinea recisa Morelet. Wounta Haulover, in a puddle left by the rainy season, between the sea and the lagoon and not more than 100 yards from either. The bottom of the pool was grass-covered. Shells were clinging to a stem of cocoanut leaf, which had fallen and was submerged. 25 specimens. In the dry season the spot is dry and the grass dead, and the lagoon and all the water courses for miles around are salty. I never saw this shell anywhere else except on the banks of a little run in Bluefields, where they were rare.

Melampus flavus Gmel. Man of War Keys. Large, banded and unbanded specimens.

Melampus coffea Linn. Wounta.

Exceedingly numerous. Used as beads by Indians. The unbanded variety will average larger than the banded. In March, 1903, I collected some of these shells at the Bluff near Bluefields, but the shells were all small, none being larger than *M. lineatus* say of the North Atlantic. In the spring of the three years preceding 1903, I searched the same spot, but found none of these shells. I am inclined to regard them as newcomers to Bluefield.

Teredo sp ? Wounta Haulover and everywhere on the coast.

Pholas campechensis Gmel. Wounta Haulover, Prinzapolka, etc. Of the hundreds of valves cast up daily, I never found anything but *right* valves. Cannot some one who knows write an article on why it is that single right or left valves, as the case may be, are often found, to the exclusion of the other valves?

Tagelus poeyii Dall. Prinzapolka. On the beach toward the south from the town. Rare. Only 3 specimens.

Periploma inequivalvis Schum. Wounta Haulover. *Right* valves only.

Mactra (*Mactrella*) *alata* Spengler. Wounta Haulover, and along

the whole coast. Abundant, both alive and dead; fragile, white and beautiful.

Mulinia gaudeloupensis Recluz. Single valves on the shore at Wounta Haulover.

(*To be continued.*)

NEW VARIETIES OF NORTH AMERICAN PISIDIA.

BY V. STERKI.

During the twelve years' study of our Pisidia, on about 350,000 specimens examined, many new forms were found. Some of them have been published from time to time, since 1895, in the NAUTILUS, others were held back, mostly for years, in the hope of getting additional materials which would more clearly show their relations and positions. Owing to the great variation of most of our species, with some apparently endless, it is often difficult to know, or even to estimate, whether a new Pisidium represents a new species, or a variety, and it seemed preferable to be rather over-cautious with regard to "n. sp." than too hasty. Yet new forms, more or less different from those published or regarded as typical for a species, should be named and described, and short descriptions of a number of such are offered in the following lines. They are ranged under species already known, as varieties, in many instances with some doubts, leaving it for further evidence to prove their real affinities or their claims to representing distinct species. A few short notes are necessarily added, but a more detailed discussion of the affinities etc., of the various species and forms is left for a forthcoming revision of our Pisidia.

Pisidium idahoense Roper var. *indianense* n. Smaller than the types, less inflated; beaks much narrower, low, little prominent over the hinge margin; surface with several well-marked lines of growth, more horn-colored than in the other forms; shell and hinge slight, the right cardinal tooth less curved; long. 8, alt. 7, diam. 4 mill.

Hab.: Lake Maxinkurkee, Ind., collected in considerable numbers by Drs. Evermann and Bartsch, for the U. S. Fish Commission.

As compared with the types from Idaho and the larger, much inflated form from Seattle, Washington, the Indiana Pisidium appears to be of a distinct species. Yet a form, eventually a var., from

Lake Michigan: Charlevoix (Walker) and the South end (Daniels) is somewhat intermediate, although more like the Idaho form, and so it appears to be safer to regard the above as a variety of the same species for the present.

Pisidium compressum Pr., is very variable, but a number of its forms and varieties are characteristic and rather constant. As typical is accepted the common river and creek form: beaks high, narrow, with well developed appendages, above which there are small flattened or even impressed smoothish areas, usually with more or less distinct radial lines; balance of the surface with rather coarse, sharp, regular, concentric striæ, dull, with microscopic wrinkles, color whitish to grayish, and often there are marginal zones of straw to yellow color, with more shallow, irregular striæ, more or less shining; shell and hinge stout, with whitish nacre.

Var. *opacum* n. In shape and size near the typical form, well inflated, but the surface is finely and irregularly striate, dull to shining, color often plumbeous above; beaks with the appendages slighter, or merely flattened on top; shell and hinge stout, the former opaque.

This is a form of sloughs, ditches, pools, etc., along rivers and creeks, quiet places in such, with muddy bottom, also of lakes and ponds near inlets; it seems to be a retrograde one, with respect to the surface sculpture, and it is notable that also the young in such places have the fine, obsolete striæ.

Var. *lævigatum* n. Moderately oblique, of medium to rather large size, generally well inflated; beaks less elevated, rounded or more or less flattened on top with slight or obsolete ridges; surface with fine, irregular striæ to nearly smooth, more or less shining; color light to dark horn; shell slight, translucent, nacre, more glassy; hinge slight, generally less angular than in the type.

Widely distributed, in quiet waters. These mussels often have considerable resemblance, in shape, with *Pis. variabile* Pr. (which is variable on somewhat corresponding lines), and it is sometimes very difficult to distinguish dead or fossil specimens of the two, and even fresh shells of certain forms.

Var. *limnicolum* n. Near *lævigatum*, but much smaller, some specimens have ridges or well-formed appendages on the beaks; shell and hinge slight, cardinal teeth well formed. A form of deeper, quiet water, lakes, etc. Hundreds of specimens at all stages

of growth were collected in the Fox River, Wisconsin, by the late Geo. T. Marston.

Var. *rostratum* n. Of medium size, moderately to rather well inflated, oblique, outlines slightly angular; beaks little prominent, rounded or with slight ridges around the slightly flattened central areas; angles at scutum and scutellum well projecting, slightly rounded, especially at the latter, the projecting part of the mussel is somewhat rostrum-like, pinched, surface with fine, irregular striæ, somewhat glossy; color pale to yellowish or brownish-horn, shell rather thin, translucent, hinge slight, with the teeth small but well formed.

The typical form (of the var.) from Reed Lake (Dr. Kirkland), Blue Lake, and other waters in Michigan, Clear Lake, Indiana (Daniels).

Var. *arrosum* n. Rather small and low, not very oblique, outlines somewhat angular, moderately inflated, beaks not much elevated, narrow, rounded or slightly flattened on top, without appendages, and with barely any radial lines; surface with very fine striæ above, becoming somewhat more distant and irregular towards the margins, slightly shining, color pale to yellowish or reddish-horn, shell thin, somewhat translucent, hinge slight.

Michigan: Grand Rapids in several lots (Streng, Kent Scient. Inst.), Blue Lake, Allegan Co. (Dr. Kirkland), Brooks Lake, Newaygo Co. (Streng), Green Creek, Allegan Co. (Walker). A peculiarity of this rather constant form is a disease found on the shells of almost all specimens: small white spots of erosion gradually becoming confluent and extending over a large part of the surface.

Var. *confertum* n. Of medium size, somewhat oblique, well and compactly inflated; beaks broad, not much prominent, slightly flattened on top, or rounded, without appendages; upper margin moderately curved, with projecting angles where passing into the supero-anterior and posterior slopes which are well marked, rather long, straight, the former steep, the latter nearly perpendicular; scutum and scutellum marked in some specimens; surface with irregular, slight striæ and lines of growth, dullish to slightly shining; color straw to yellowish, reddish or brownish-horn, generally with irregular, lighter and darker, concentric zones; shell rather stout, slightly translucent, nacre whitish, muscle insertions well marked, hinge moderately stout, as compared with typical *compressum*, median

part (plate) rather long and slightly curved; cardinal teeth small and rather defective,[1] of the right, the posterior end is small, simple, the anterior small, low and nearly obsolete, the left anterior short, somewhat massive, the posterior oblique, short, slight and not projecting over the level of the valve-edge, lateral teeth at strong angles to the plate, the right ones little elevated, the cusps of the left rounded; ligament stout, covered in younger, partially or quite uncovered in adult specimens.

Size: long. 4, alt. 3.8, diam. 2.8 mill. (average).

Habitat: Blue Lake, Muskegon co., Michigan, collected by Dr. Kirkland, in good numbers, remarkably uniform.

This is certainly a remarkable form, and has rather the significance of a species, yet seems to be connected with other forms of *P. compressum*.

Var. *coosaense* n. Of medium size, straw to light horn colored; in shape near the typical form, with rather posterior, narrow, elevated beaks bearing appendages; superior margin somewhat less curved and rather long, the supero-anterior slope somewhat more remote from the beaks; surface with fine to very fine striæ, dull to slightly shining. Shell and hinge rather strong.

Hab.: Georgia and Alabama, along the Coosa river (collected by Smith, sent by B. Walker).

In younger to two-thirds grown specimens, the features of this form are especially well marked: the outlines rather angular, all margins little curved, while full-grown examples are approaching the typical form, except as to surface sculpture.

Var. *contrarium* n. Of medium size, well inflated, moderately oblique; outlines various from near those of *coosaense* and the typical form, though less angular, to rounded, nearly oblong or oval, with only the supero-anterior slope more or less marked; beaks generally less posterior, moderately elevated, rather narrow, with a small, more or less flattened area on top, and a slight ridge or even small appendage; surface with rather fine, crowded, sharp, regular striæ, dull; color pale to grayish horn, often with a light zone along the margins; shell and hinge rather stout. This Pisidium, although rather variable in itself, and probably connected with other forms, marks an interesting contrast to *coosaense* as well as to the type, and *laevigatum*, etc.

Alabama: Attalla, Calera, Ebenezer Church, Montevallo. (Smith collected, B. Walker sent.)

Var. *smithii* n. Of rather good size, little inequipartite, somewhat oblique, moderately to rather well inflated, more so near the beaks, while the lower parts of the disks are rather flat; outlines rather angular, with the angles more or less rounded, superior and inferior margins moderately curved, the superior rather long; supero-anterior slope nearly straight, steep, posterior part subtruncate; beaks not

[1] In several specimens examined.

much behind the middle, prominent, rather narrow, more or less flattened on top, with ridges or slight appendages; surface with rather crowded, sharp, regular striæ, dullish; color from light horn, in the younger, to brownish; light chestnut in adult specimens.

Hab.: Shoal creek, Alabama (Hinkley).

This form is mainly characterized by its beaks being less posterior than in most others, and, as it seems, by its brownish color.

The above are a few of the more marked forms of the very polymorphous *P. compressum* Pr. More have been noticed, and some of them will probably also have to be named and described; besides, more will be brought up with new materials.

Pisidium fallax Sterki var. *mite* n. Rather smaller than the typical form, beaks without appendages, or slightly flattened on top; shell and hinge slighter.

Hab.: Grand river, Michigan (Dr. Kirkland), Nimishillen creek, Canton, Ohio (Sterki).

Var. *errans* Sterki. Has been published as var. *septentrionale* Sterki. (The NAUTILUS, XII., p. 78.) The name, being preoccupied,[1] had to be changed. This well-characterized Pisidium has been seen from northern Maine, northern Michigan, Minnesota and Keewatin. (McInnes Col., Whiteaves sent.)

Pisidium punctatum Sterki var. *armatum* n. Higher, and often larger, than the typical form, beaks very prominent, with strong appendages, which give the mussel quite a different shape and appearance.

Hab.: Tuscarawas river, Ohio (Sterki), and other places.

Var. *simplex* n. Beaks without appendages, rounded or slightly flattened on top; striation slighter; mussel sometimes smaller than the typical form.

Hab.: Joliet, Illinois (Ferriss, Handwerk), Carp Lake near Mackinaw, Michigan (Walker), Fox River, Wisconsin (Marston).

(*To be continued.*)

GENERAL NOTES.

MASSACHUSETTS SLUGS.—I am indebted to Mr. John Ritchie, Jr., for two lots of slugs collected in the vicinity of Boston. The first lot included *Arion subfuscus*, Draparnaud, of the form called *cinereo-fuscus*, Drap., and *Limax maximus*, L., of three forms, the first nearly typical, the second var. *obscurus*, Moquin-Tandon, and the third var. *cellarius*, Moquin-Tandon. A series received to-day, collected by Mr. Abner Hatfield at Jamaica Plain, includes *A. subfuscus*, v. *cinereo-fuscus*, *L. maximus* and *Agriolimax agrestis*. The *A. agrestis* unfortunately are dead and somewhat spoiled, but they are of the dark and reddish forms, not the very pale kinds so common in England. I was glad to confirm the Boston *Arion* as *A. subfuscus*. T. D. A. COCKERELL.

[1] T. Prime, Cat. of 1895, "undescribed."

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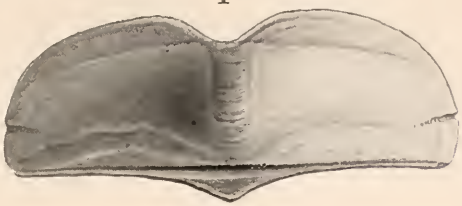

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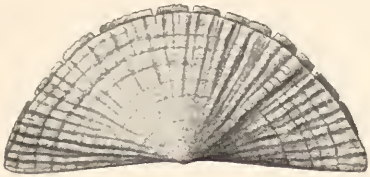

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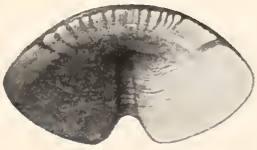

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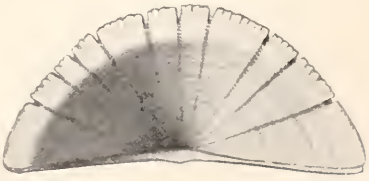

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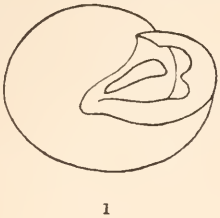

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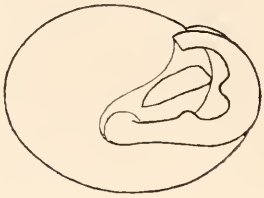

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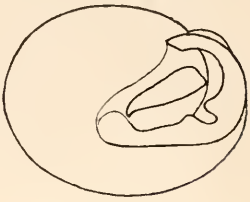

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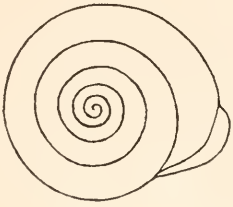

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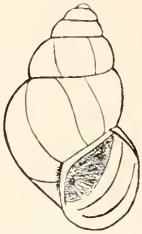

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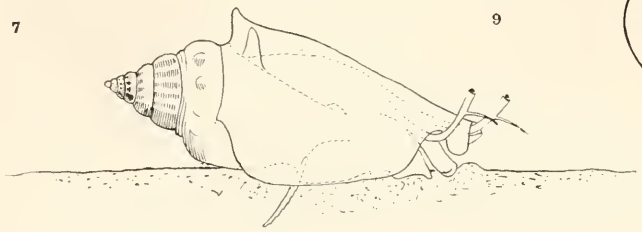

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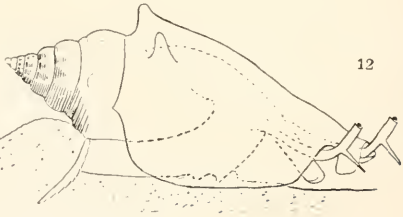

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CLAPP: NEW ALABAMA MOLLUSKS.
COLTON: STROMBUS PUGILIS.

THE NAUTILUS.

VOL. XIX. DECEMBER, 1905. No. 8.

SOME NOTES ON LIVING STROMBUS PUGILIS.

BY HAROLD SELLERS COLTON.

In the latter part of January a severe norther cast many individuals of *Strombus pugilis* upon the beach of Sand Key near Clearwater Harbor, Florida. I sent many north to Dr. Burnett Smith, of the University of Pennsylvania, who had intended to determine if there was a case of sexual dimorphism in this species. Circumstances preventing him from touching the material for the present, he persuaded me to work upon it. The results of my measurements were published in the March NAUTILUS. As the natural history of the Mollusca is so little known, I hope a few notes of my observations will not be out of place.

Strombus pugilis is very hardy and easily transported. I expressed alive twenty-five individuals in a starch box. Each one I wrapped in dry newspaper; two weeks afterward, and a week and a half after they had rested in a warm room, a number were yet alive and none had as yet begun to decompose. Another lot I packed in damp seaweed and four days afterward I unpacked them and placed them in an aquarium in Philadelphia. They started to crawl about at once. When I left Philadelphia in the early part of June one was yet alive. Several were killed by the starfish and the others lived for four months and then died from unknown causes.

I had occasion to break open a number of the shells with a hammer in order to remove the soft parts for anatomical purposes. This I found a very difficult task. The shell is so resisting that many blows in the same place were required to make even a small hole. This

great strength of shell shows how well they are protected to withstand the surf of the exposed beach.

On such a beach *Strombus pugilis* is the most common visible Gasteropod in the winter. Others may be abundant at other seasons of the year. I found none alive nor did I find a dead shell within the still waters of Clearwater Harbor, although the flats and bottom were composed of sand as is the outside beach; and a series of extremely low tides allowed me to traverse miles of bottom not ordinarily exposed at low tide. Since they are cast up by the surf in large numbers in a storm they must be abundant just beyond the breaker line.

Within the mantle cavity I found a species of oyster crab that Miss Rathbun has given the name of *Pinnotheres strombi*. A commensal of this sort I believe is unique in a Gasteropod shell.

Every collection of tropical marine shells contains the shells of Strombus. The bright colors exhibited by most of the species are perhaps its chief attraction. Its activity when alive is noted all through the literature. Not alone are its movements described but pages are covered with beautiful colored drawings of the animal. Most of the activities have been described from animals under abnormal conditions, and the drawings made from animals out of the water. Nowhere can I find a sketch nor a description of the animal in a living attitude.

Locomotion in Strombus and its allies is peculiar. This is due to the structure of the foot. The operculum has changed from an organ of protection to one of locomotion. Situated as in most Gasterpods on the dorsal surface of the metapodium, it is peculiar because it is joined to the foot by about one-third of its surface. The two-thirds free extends downward and in a posterior direction, with its slender point turned toward the left side. The propodium and mesopodium compose one-sixth the ventral surface of the foot, the rest is metapodium.

I quote from the voyage of the "Astrolabe :" "Le form particulier de leur pied ne permet pas de marcher comme les Gasteropodes. Ne pouvent pas ramper ils sautent en prenant un point fixè sur le sol à l'aide de leur opercule." Adams in the voyage of the "Samarang" describes their method of locomotion as rolling over and over. Both of these observations are founded on fact; the former was observed in the water and the latter on land.

By placing them very close to the glass of the aquarium I was able to observe their movements with some detail. When preparing to move they extend their propodium in an anterior direction, at the same time contracting their metapodium (Plate III, fig. 11). They bend the anterior end of their propodium down into the sand, and as the natural position of the operculum is downward and backward at an angle, when the metapodium is thrust out, the operculum sinks into the sand. With the propodium and operculum as anchors the heavy shell is slid forward (Plate III, fig. 12). Sometimes I have seen them project the end of their metapodium out as far as the tip of the spire. The movement is about an inch and a half per step. The track is represented by a series of little ridges. There is a depression on the edge of the lip of the aperture that would on a superficial examination seem to correspond to the anterior siphon canal that is found in many Gasteropods. Through this groove the right eye-stalk protrudes, and the left eye-stalk comes through the true groove of the anterior siphon canal, although no fold of the mantle extends beyond the interior of the shell. (Plate III, fig. 13.)

The sight of this mollusk is remarked on in almost every account of it. It was my own experience that they would draw within their shell whenever I came within four feet of the aquarium. They also react to a jar. They react definitely when a solid object is passed between them and the source of light. Just how keen their sight really is I was unable to determine.

All the time I had them in the aquarium I never succeeded in getting one to eat. I tried fresh oyster meat and oysters that were opened and placed in salt water for two or three days. I also tried raw beef. It is described as a "buzzard among mollusks," but I was not able to observe it feed. When crawling in the sand it swings its proboscis from side to side like an elephant, sometimes dipping the tip into the sand and working its powerful radula. But I could never observe the presence of food of any kind. In the four months I had them in captivity they did not seem to waste away appreciably.

Strombus is a very interesting mollusk, and would repay study in several fields. Its hardiness assures its easy transportation, and it will live months in confinement. Its eye is wonderfully well adapted to study the histology of the Gasteropod eye, as it can be preserved without distortion. The large size, abundance and bright colors of the shell make it a conspicuous object on the beach.

LITERATURE.

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Colton, 1905. NAUTILUS, April, vol. xviii, p. 138. Sexual Dimorphism in Strombus pugilis Linné.

Fluck, 1905. NAUTILUS, July, vol. xix, p. 32. Shell-Collecting on the Mosquito Coast of Nicaragua.

Quay and Gamard, 1834. Voyage de l'Astrolabe, vol. iii, p. 55–60.

Rathbun, 1905. Proc. Acad. Nat. Sci., Phila., vol. lvii, part ii, p. 371. Description of a New Species of Commensal Crab.

Souleyet, 1852. Voyage de la Bonite, vol. xii, p. 164.

A NEW CHITON FROM THE NEW ENGLAND COAST.

BY WILLIAM HEALEY DALL.

Mr. Dwight Blaney of Boston, while dredging in twenty fathoms off Ironbound Island on the Maine coast, was fortunate enough to discover a species of Chiton which, after comparison with Northeast American and North European species, appears to be new.

Seven species of Chitonidæ are known from the coast of New England in less than 100 fathoms. All these have been known for many years. One Arctic species is reported from the Gulf of St. Lawrence and may reach the Maine coast. Besides these there are two species known only from abyssal water in the North Atlantic, not from the coast and not properly belonging to the New England fauna. It is therefore a matter of more than common interest to have a new species discovered, and, because the circulation of the Proceedings of the Biological Society of Washington may probably not reach the mass of malacologists, it was thought desirable to reprint the diagnosis here and add to it a careful illustration of the type.

TONICELLA BLANEYI Dall. Plate IV. Proc. Biol. Soc. Wash., xviii, 1905, pp. 203–4, Sept. 2, 1905.

Shell of a deep rose-color, with fine white lineations and reticular markings; girdle brown, apparently naked, but exhibiting under high magnification a microscopic granulation with a row of small spinules at the extreme edge, as in *T. marmorea;* the coloration of

the valves outside, in the type specimen, is fairly uniform but probably more or less variable among individuals; the valves inside are of a deep rose-pink, paler toward the edges; surface minutely more or less quincuncially punctate, but this is visible only when magnified; the sculpture consists of (on the midvalves usually three) radial riblets with a tendency to bifurcate or break up into segments distally; there are no distinctly marked areas on the midvalves, but the part of the valves which bears what in many chitons are called the lateral areas, in this species carries two or three, sometimes bifurcate, thread-like ribs which are flattened above and rarely reach the mucro of the valve, being usually evanescent dorsally; there are also more or less deeply impressed lines of growth; the median part of the valves is nearly smooth except for the microscopic punctation; anterior valve semicircular, with numerous, more or less irregular, radial riblets that resemble those on the midvalves; the eaves are conspicuously spongy; the insertion plates are blunt, crenulate at the edge, but not radially striate; the anterior valve in the type has 10, but would seem normally to have either 9 or 11 slits, as one seems missing or in excess, on one side; the midvalves have one slit on each side, their anterior lamellæ are nearly continuous across the dorsal sinus; the posterior valve is small, without a mucro, the incremental lines strong, the ribbing obsolete or nearly so; in the type, while there is not a posterior sinus like that of *Chætopleura*, there is a certain flattening and the insertion plates bordering this part of the valve are poorly developed; there are 7–9 slits between which the distal edges of the plates are more or less irregularly crenate; in the dried specimen the muzzle has a prominent "veil" or tegumentary margin; the ctenidia number about 15 on each side and extend forward on each side of the foot to the fourth valve; length over all (dry), 13mm.; width, 8 mm.; dorsal angle, 120°.

Dredged in 20 fathoms off Ironbound Island, Frenchman's Bay, near Mt. Desert Island, Maine.

From *Trachydermon ruber*, *Tonicella marmorea*, and similar species, this form can be at once distinguished by the ribbing. If the type specimen be characteristic in its color, the pattern and hue would be equally distinctive. In *T. ruber* the girdle is pubescent and parti-colored; in *T. marmorea* and the present species it is of a uniform brown. The type specimen has been generously donated to the U. S. National Museum.

The species seems somewhat intermediate between *Tonicella* and *Trachydermon*, with a leaning toward the former, while it seems to be most nearly related specifically to *Tonicella marmorea* of Fabricus.

Explanation of Plate IV.

Fig. 1. Middle valve, interior, from below; 2. The same valve from above; 3. Front valve from above; 6. The same valve from below; 4. The tail valve from above; 5. The same valve from below; owing to the spongy condition of the margin the artist has slightly exaggerated some of the vertical striæ so that they are liable to be taken for true notches, the number of which is as stated in the diagnosis above. All the figures are considerably magnified, and to a uniform scale.

A NEW BRACKISH-WATER SNAIL FROM NEW ENGLAND.

BY HENRY A. PILSBRY.

Mr. Owen Bryant collected at Cohasset, Massachusetts, the past summer, specimens of an Amnicoloid snail which appears to be undescribed. It was found living in company with *Paludestrina minuta* (*Rissoa minuta* of authors) and *Odostomia impressa*.

Paludestrina salsa n. sp. Pl. III, fig. 10.

Shell very thin, perforate, oblong-conic, about the shape of *Amnicola lustrica;* corneous-gray or a little greenish; the surface having the luster of a dull silk, very finely striatulate, weakly decussated with faint spiral striæ.

Whorls $5\frac{1}{2}$, moderately convex, with the suture impressed but not so deep as is usual in *Amnicola* or *Paludestrina*. Aperture ovate, a little less than half as long as the shell, subvertical. Peristome thin and sharp, a little sinuous, the outer lip being somewhat retracted below its upper insertion; columellar margin concave, thin; the inner margin adnate, thin and straightened for a short distance near the upper angle of the aperture. Length 3.1, diam. 2, length of aperture 1.5 mm.

Cohasset, Mass. Cotypes in collections of the A. N. S. Phila. (no. 90445), Boston Society of Natural History, and Owen Bryant.

Compared with the common *P. minuta* (Totten), this new species differs in its more broadly conic shape, less deep sutures and larger

last whorl and aperture. Moreover, the apex, in all the specimens seen, is perfect, while *P. minuta* is almost invariably eroded above, several whorls being lost from the tip in adult specimens.

CARYCHIUM NANNODES N. SP.

BY GEO. H. CLAPP.

In shape this species (Plate III, figs. 7, 8, 9) resembles *C. exile*, being long and slender, but differs in being absolutely smooth, *without any trace of growth lines*, even when magnified 60 diameters; under high magnification the surface shows a faint granulation; color waxy-white, transparent, the columellar fold showing distinctly through the shell; whorls about $4\frac{1}{2}$, regularly tapering from the body-whorl to the apex; sutures deep, whorls slightly shouldered; lip wide and well reflected especially at the columella where it forms a distinct umbilical chink, outer curve of lip decidedly flattened, hardly thickened within; viewed from the back the lip is more squared below than in *exile* and *exiguum;* upper columellar fold of good size, lower one almost obsolete.

Length 1.4, diameter 0.5 mm.

Collected by Herbert H. Smith on Monte Sano, about 5 miles east of Huntsville, Ala. "Abundant among leaves in a shady ditch in damp forest near the top." (H. H. S.) Altitude about 1600 ft.

Types No. 5401 of my collection and cotypes in collections of Acad. Nat. Sci., Bryant Walker and T. H. Aldrich.

This is a most distinct species, as its size alone at once separates it from all of the other American representatives of the genus.

With this species Mr. Smith also found some *C. exile*, which agree with the northern shells, except that they are more coarsely ribbed. They are beautiful shells under the microscope.

IS COCHLIOPA ROWELLI A CALIFORNIAN SHELL?

BY H. A. PILSBRY.

Cochliopa rowelli is a small, solid umbilicate snail, somewhat heliciform or *Valvata*-shaped, and with an operculum like *Fluminicola* or *Amnicola*. It was described by Tryon from specimens received

from Gabb, who stated that Mr. J. Rowell, well known as a conchologist, found them in Clear Lake, California. Specimens are in the collections of the Academy of Natural Sciences and the Smithsonian Institution labeled as from this place; and Binney (Land and Freshwater Shells of N. A., part iii, p. 73) gives no other information. So far as I know, no other writer on Californian shells has noticed the species. Its status as a member of our fauna has rested for forty years only upon the information given by Gabb.

In the collection of the Academy there are also specimens of the same species from *Panama*, received from the late Dr. Wesley Newcomb. The other described species of the genus *Cochliopa*, some four in number, are from Central America.

As the occurrence of the genus in California waters is a matter of some importance from a zoögeographic standpoint, we would ask all collectors in Central California to give what information they can upon it, whether relating to the original finding of the snail or to its present distribution. The experience of any who have collected in Clear Lake will be of interest, whether the species in question has been found or not.

PUBLICATIONS RECEIVED.

SHELLS OF PORTLAND AND VICINITY.—This is the title of an article by J. W. Mighels, which appeared in the Portland Tribune, 1841, page 64. The exact date of publication is not given on the clipping, which was found by Mr. Owen Bryant in an old book purchased in Boston. It probably represents the first catalogue ever published of the shells of Maine. A few remarks commending the study of conchology, and soliciting exchanges, is followed by a list, without notes, containing about 154 species, exclusive of the barnacles, etc., arranged according to the Lamarckian system. C. W. J.

THE OYSTER.—A popular summary of a scientific study. By Wm. K. Brooks, Ph. D. (The John Hopkins Press, Baltimore.) One of the most interesting and readable books pertaining to the mollusca that has ever been published. It points out clearly the possibilities of oyster culture, the anatomy and development of the oyster; artificial cultivation; the cause of the decline of the oyster industry and the remedy. C. W. J.

Land and Fresh-Water Mollusks of Alaska and Adjoining Regions. By William H. Dall (vol. xiii of the Harriman Alaska Expedition. The scope of this handsomely printed volume of 171 + xii pp. is as follows: "The first object of this work is to sum up the known molluscan fauna of the land and fresh waters of Alaska. This has involved an examination not only of the species obtained within the political boundaries of Alaska, but also those of the adjacent regions to the west, east and south. The result is that, for North America north of latitude 49° north, the work includes a summary of our present knowledge of the mollusks, deduced in part from the literature and in larger part from material actually examined. To this is added a briefer examination of the mollusk fauna of the adjacent parts of eastern Siberia, which has to some extent modified that of Alaska."

Four faunas are recognized as influencing the Alaskan non-marine mollusks: that of northern Canada, that of the northern Pacific States of the U. S., and in a much less degree the fauna of northeastern Asia, and the Holarctic group of mollusks common to all northern regions. From all sources, 65 species of land and freshwater mollusks are known from within the boundaries of Alaska. In the list of species, references are restricted to original descriptions and records of occurrence in the boreal region. Most of the species are illustrated by text figures from the works of Binney and Prime, a feature largely adding to the usefulness and attractiveness of the work. Besides records from the literature, a great mass of new data is presented. Frequently vast areas are added to the known distribution of our species, supplying numerous localities where before only isolated or frequently doubtful records existed. The amount of new information is so great that no attempt to condense it here would be satisfactory. A few interesting points about particular species may be mentioned. *Epiphragmophora fidelis* and *Polygyra columbiana* are the only large Helices which actually reach Alaska, though a good many others are recorded from north of 49°. The figure of *P. monodon* (p. 26) represents *P. m. fraterna*. It is reported from Moose Factory, James Bay. *Vertigo arctica* Wallenb. is given as from Port Clarence, collected by the Vega Expedition, and *V. krauseana* Reinh. from Chilkat Inlet, Alaska. The name *Vitrea radiatula* Alder is preferred for *V. hammonis*, and many Alaskan localities are given. An addition to the American fauna is

Vitrea nitidula Drap., from Fort Resolution, Great Slave Lake. The name *Euconulus trochiformis* Montagu is used in place of *E. fulvus* Müll., in my opinion improperly. The unusual distribution of *Succinea grosvenori* Lea, from Louisiana to Fort Simpson on the upper Mackenzie, is noticed. I was also impressed with the disregard of this snail for altitude or latitude some time ago, when studying the Texan forms, yet could find no character in the shells to separate southern from northern individuals. *Succinea chrysis*, "the commonest and largest land shell of the boreal American region," is reported from many places from the Mackenzie river west. A synonym which Dr. Dall seems to have overlooked is *S. rotundata* Sowerby, Conch. Icon. xviii, pl. 11, f. 78 (1872). This name would have precedence if it were not preoccupied.

In the Lymnæidæ an interesting and valuable discussion of the generic and subgeneric synonymy of the groups is given. No attempt is made to distinguish the races of *L. stagnalis*, of which several have in recent years been brought into use by some of our students. *Lymnæa atkaensis* Dall, from Atka, Aleutian chain, is figured. The name of this species was given as *atkinensis* by Clessin in the *Conchylien Cabinet*, p. 390. The difficult group of *L. mighelsi*, *emarginata*, *binneyi*, *randolphi*, etc., is discussed at some length; and the synonymy given will prove interesting to those who have worked with these perplexing forms.

The generic and subgeneric synonymy of *Planorbis* is discussed at length, and long-needed rectifications in the nomenclature are made. Say's original spelling of *P. exacuous* is restored in place of the emended form *exacutus*. *Planorbis opercularis* Gld. includes as varieties *planulatus* Coop., *centervillensis* Tryon and *oregonensis* Van. *Planorbis nathorsti* Westerl., described from Greenland, is recognized from Labrador. A new section, *Haldemanina*, is proposed for *Segmentina wheatleyi* Lea.

In the *Unionidæ*, the northwestern *Margaritana margaritifera* is recognized as var. *falcata* Gld. It differs from the typical form by the purple nacre. It has invaded the head-waters of the Missouri in Montana, and occurs also in Alaska. The new species and varieties are as follows, most of them are illustrated on two handsome heliotype plates:

Polygyra germana var. *megasoma*. "More than four times the size of the typical *germana*, but otherwise quite similar. Northern California" (p. 26).

Circinoria vancouverensis var. *chocolata.* "A variety of a dark chocolate-brown color, otherwise like the ordinary form, was found rather commonly at Sitka."

Vitrina alaskana Dall, new name for *V. pfeifferi* Newc., "not *V. pfeifferi* Deshayes in Fér. Limaçons, 1822." I have been unable to trace any *V. pfeifferi* in Férussac's work which is cited without page reference as above. *Vitrina* is not recognized as a genus in that work, which so far as I recollect was published before Deshayes had begun publishing on land shells. It would be well to await fuller data proving preoccupation before rejecting Newcomb's well-known name for this species.

Oreohelix strigosa var. *stantoni.* Dwarfed, measuring in maximum diam. 10, min. 8.5, height 8 mm., with about 5 whorls, umbilicus 1 mm. Assiniboia, 33 miles s.-e. of Medicine Hat., near top of Cypress Hills, alt. 4700 ft.

Lymnæa petersi Dall. Koyukuk River, north of the Yukon, in Alaska. A delicate species of the typical group of Lymnæa, 16 mm. long.

Lymnæa (*binneyi* var.?) *preblei* Dall. A large and peculiar form from Manitoba and Keewatin, 37–38 mm. long.

Lymnæa perpolita Dall. A small, dark, smooth and polished form from Nushagak, Bristol Bay, Alaska.

Lymnæa anticostiana Dall. Pleistocene marl of Marl Lake, Anticosti Island.

Planorbis campanulatus var. *rudentis* Dall. Wider and flatter than the type. Knee Lake, Keewatin.

P. exacuous var. *megas* Dall. Whitish, and larger than the typical form. Manitoba.

Segmentina (*Planorbula*) *christyi* Dall. Manitoba. Larger, flatter and more sharply sculptured than *S. armigera* Say.

Valvata (*sincera* var.?) *nylanderi* Dall. Aroostook Co., Maine.

Valvata lewisi var. *helicoidea* Dall. With typical *lewisi* especially northwestward. More depressed, with the last half whorl more peripherally diverted.

The work will take a place hitherto unfilled in America, that of a standard fauna of the region north of the United States boundary. It is a pleasure to add that the mechanical execution, paper, typography and press-work, are worthy of the subject-matter, and are a credit to the publishers, Messrs. Doubleday, Page & Co.

H. A. P.

NOTES.

Achatina gracilior Boettger.—This fine species described from Camroon in the Nachrichtsblatt for this year, p. 167, pl. 7, f. 1, 2 (issued about Nov. 1, 1905), seems to be quite identical with *A. papyracea* var. *adelinæ* Pils., Manual of Conchology, part 67, p. 118, pl. 20, f. 4, 5 (issued March 1, 1905).

Physa rhomboidea.—The name *Physa rhomboidea* was originally applied by Meek and Hayden (Proc. Acad. Nat. Sci. Phila., 1856) to a Cretaceous fossil. Hence *P. rhymboidea* Crandall becomes a homonym. It does not seem necessary to propose a new name since Miss Springer's recent paper in Proc. Acad. Nat. Sci. Phila., (1902 p. 513) indicates that it is not essentially different from *P. humerosa*. —T. D. A. Cockerell.

November snails.—At noon of Nov. 21, I was out for an hour, to look after some mollusks, along a dry, gravelly bank exposed to the sun nearly all day, during summer. A few trees, shrubs and herbage were shading part of it. We had had severe frosts night after night, and the soil was usually frozen till late in the forenoon. Under boards, bricks and stones, the following mollusks were found apparently none the worse from being frozen in most of the time.

Agriolimax campestris Say, several hundred specimens, some of them only half grown, others young, only a few millimeters long; newly laid ova were found, and one containing a nearly mature embryo. Two specimens were seen in the characteristic attitude ready for copulation. Freshly deposited ova have also been found in the earliest spring days, some years ago.

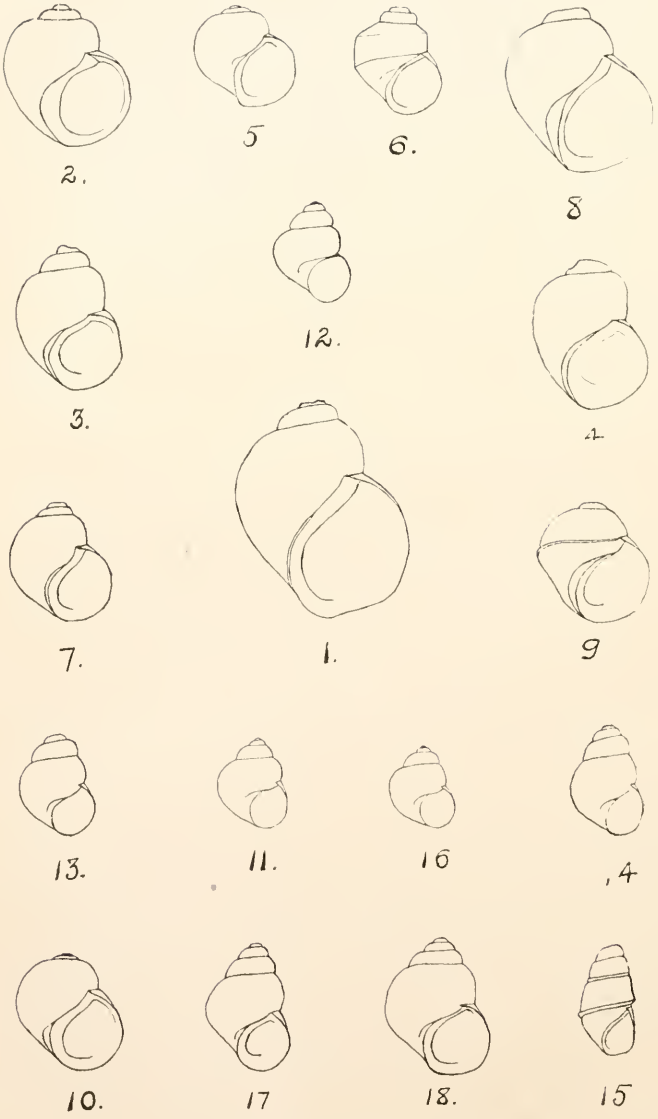
Zonitoides arboreus Say, common.

Patula striatella Anth., common, more at shaded places. *Vallonia* about 40 specimens, 33 of which were *costata* Müll., 5 *pulchella* Müll. and 2 *excentrica* St. In general *V. pulchella*, and also *excentrica* are found in comparatively larger numbers, or exclusively in more shaded and damp localities.

Bifidaria armifera Say, several under a tree; but often it is found at exposed dry localities.

Succinea avara Say, common.

Succinea aetusa Lea, one specimen, nearly full grown, another rather small.— V. Sterki.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The Nautilus.

Vol. XIX. JANUARY, 1906. No. 9.

NEW AND LITTLE KNOWN SPECIES OF AMNICOLIDAE.

BY BRYANT WALKER.

Most of the following species were found by Mr. A. A. Hinkley of Du Bois, Illinois, while on a collecting trip through Tennessee, Mississippi and Alabama, in the fall of 1904. A few others received from different sources have also been included.

Somatogyrus substriatus, n. sp. Pl. 5, fig. 1.

Shell subglobose, imperforate, shining, light greenish-yellow, lightly but distinctly striate, spire somewhat elevated, apex obtuse. Whorls 4–4½, those of the spire prominent and roundly shouldered; body-whorl large and well rounded; suture deeply impressed. Aperture large, quite oblique, suborbicular, slightly emarginate at the base and somewhat roundly projecting at the juncture of the lip with the base of the columella; lip thin, projecting above and drawn back below. Slightly thickened within. Columella rather narrow, with a heavy rounded callous, which is thinner on the body-whorl and separated below by a narrow axial groove.

Alt. (apex eroded) 6, diam. 4 mm.

Types (No. 22370 Coll. Walker) from the Tennessee River at Florence, Ala. Also Tombigbee River at Columbus, Miss. Cotypes in the collections of the Academy of Natural Sciences and A. A. Hinkley.

This is one of the largest species of the genus, being exceeded in size only by *S. subglobosus*. It is a well marked form, very much like a small *Fluminicola nuttalliana* Lea, in appearance, and is easily

distinguished by its size, elevation of spire and striate surface. It occurred in considerable abundance at both localities.

SOMATOGYRUS HUMEROSUS, n. sp. Pl. 5, fig. 2.

Shell small, subglobular, imperforate, pale-green, smooth, shining; spire prominent, short, sub-conic with a small, obtuse apex. Whorls $3\frac{1}{2}$, roundly shouldered above and flattened toward the suture, body inflated, somewhat flattened on the periphery and at the base; suture deeply impressed. Aperture large, subcircular, slightly emarginate below. Lip thickened throughout, the callus rounding out to a sharp edge. Columella concave, with a heavy, flat callus which extends from one extremity of the lip to the other, and entirely covers the umbilicus.

Alt. 4, diam. 3.75 mm.

Types (No. 22372 Coll. Walker) from the Tennessee River at Florence, Ala. Cotypes in the collection of the Academy of Natural Sciences and A. A. Hinkley.

The only species to which this can be compared is the *S. crassus* from the Coosa. It differs, however, in being less solid and more globular, in the heavily shouldered whorls and the flattening of the periphery and base.

SOMATOGYRUS QUADRATUS, n. sp. Pl. 5, figs. 3 and 4.

Shell subglobose, turbinate, imperforate, thick, solid, greenish-yellow, smooth, except for fine lines of growth. Spire elevated, obtuse, whorls $3\frac{1}{2}$, strongly and roundly shouldered, flattened above and on the sides; body-whorl large, quadrate, sometimes somewhat swollen above. Aperture rounded but not expanded. Columella with a very heavy, rather narrow, flattened callus which extends over the parietal wall and is separated below the axis from the body-whorl by a deep axial groove. Lip sharp, heavily thickened within; its insertion on the parietal wall is below the periphery.

Alt. (fig. 3, apex eroded) 4, diam. 3 mm.

Alt. (fig. 4, apex eroded) 4.25, diam. 3.5 mm.

Types (No. 22373 Coll. Walker) from the Tennessee River, Florence, Ala. Also Shoal Creek at the same place. Cotypes in the collections of the Academy of Natural Sciences and A. A. Hinkley.

This species is closely allied to *S. georgianus*, but differs uniformly in being smaller and imperforate, in the flattened, heavily-shouldered whorls and smaller aperture. As shown by the figures there is con-

siderable variation in the shape, some examples being almost subcylindrical, while others are more inflated toward the shoulder. This is perhaps a sexual difference, and has been noticed in one or two other species.

SOMATOGYRUS STRENGI Pilsbry and Walker, n. sp. Pl. 5, fig. 5.

Shell small, globose, umbilicate, pale green, smooth, with very fine lines of growth. Spire short, depressed, flattened at the apex. Whorls 3, convex, slightly flattened toward the suture, which is well impressed; body-whorl large, inflated. Aperture broadly ovate, angled above and rounded below. Lip sharp, somewhat roundly expanded at its juncture with the base of the columella. Columella concave, narrow; columellar callus flattened, extending over the parietal wall, separated below by a well-defined axial groove.

Alt. 3, diam. 3 mm.

Types (No. 22374 Coll. Walker) from the Tennessee River, Florence, Ala. Also Shoal Creek at the same place and Bridgeport, Ala. Cotypes in the collections of the Academy of Natural Sciences and A. A. Hinkley. This very distinct little species was found in considerable abundance at both localities at Florence. It is the Tennessean analogue of the Coosan *S. umbilicatus*, but differs in the depressed spire, more inflated form, flattened columella and axial groove.

A single immature example of this species from Bridgeport, Ala., received from Mr. L. H. Streng, of Grand Rapids, Mich., has been in the collection of the Academy for several years, but has been withheld from publication until further material could be had. Dr. Pilsbry and myself unite in naming this interesting form after Mr. Streng, who for more than fifty years has been actively interested in conchology, and who is the last survivor of the group of collectors that for many years made Grand Rapids the scientific centre of the State.

SOMATOGYRUS BIANGULATUS, n. sp. Pl. 5, fig. 6.

Shell small, obtusely-conic, turbiniform, umbilicate, light greenish-yellow, smooth, lines of growth very fine, spire elevated, flattened at the apex. Whorls $3\frac{1}{2}$, regularly increasing, angularly shouldered above, flattened above and below the shoulder; body-whorl moderately large, biangulate, shoulder flattened, sloping obliquely from the

suture to the superior angle, which is quite obtuse, periphery carinate, the whorl being almost straight between the two angles, obliquely flattened below. Aperture moderate, subcircular; slightly modified by the angle of the body-whorl, and slightly expanded at its juncture with the columella. Columella very narrow, rounded; columellar callus not very heavy, thin and transparent on the parietal wall.

Alt. 3, diam. 2.75 mm.

Tennessee River, Florence, Ala. Types (No. 22376 Coll. Walker). Cotypes in collection of A. A. Hinkley.

Only two specimens of this remarkable little species were found. But it is so entirely distinct from all the known species that I have no hesitation in describing it. With the exception of *S. aldrichi*, herein described, it is the only carinate species known.

Somatogyrus excavatus, n. sp. Pl. 5, fig. 7.

Shell small, globosely-conic, imperforate, rather thick, solid, pale green, smooth, lines of growth very fine. Spire short, conic, obtuse; whorls $3\frac{1}{2}$; those of the spire convex, with a well-impressed suture; body-whorl rather inflated, convexly rounded. Aperture subcircular, slightly angled above and broadly rounded below. Columella very concave, with a moderately wide, heavy, flat callus, which extends over the parietal wall, and below the axis is separated by a wide axial groove. Lip simple, but thickened within and somewhat emarginate below.

Alt. $3\frac{1}{2}$, diam. 3 mm.

Shoal Creek, Florence, Ala. Types (No. 22378 Coll. Walker). Cotypes in the collections of the Academy of Natural Sciences and A. A. Hinkley. A solid little species, distinguished by its globosely conic shape, thickened lip and axial groove.

(*To be continued.*)

A NEW TERTIARY PLANORBIS.

BY T. D. A. COCKERELL.

Planorbis florissantensis, n. sp.

Diameter about $2\frac{2}{3}$ mm., flattish, with about $4\frac{1}{4}$ slightly convex whorls, the last rapidly enlarging, much in the manner of *P. albus*,

Müller; color very pale; sculpture weak, consisting of fine lines of growth crossing the whorls somewhat obliquely, the more distinct ones on the last whorl occurring at rather regular intervals, some 55 micromillemeters apart. Diameter of last whorl about three times that of penultimate ones.

Hab.—Oligocene beds at Florissant, Colorado, collected by Judge J. Henderson and Dr. F. Ramalley, of the University of Colorado, 1905. The exact locality is southwest of Florissant, in plant-bearing beds, containing among other things *Planera longifolia*, Lx. On the same slab as the *Planorbis* is a small *Sphaerium*, badly crushed and broken. The *Planorbis* is not very well preserved, but I believe that it will be readily recognized from the above description. Of the species belonging to the same geological period, it is most like *P. æqualis* White, from Wyoming; but that species appears to be more convex, and, with the same number of whorls, is at least twice as large. I take it that *P. florissantensis* is a *Gyraulus*, which *P. æqualis* does not seem to be. It is rather curious that several of the fossil species of *Planorbis* found in America remind one rather of European forms, than of those living in this country to-day.* Possibly the dominant *Planorbis* of modern America may represent in part an invasion from the south, which has displaced some of the older types.

Scudder (Tertiary Insects of N. America, p. 31), mentions a *Planorbis* from Florissant, probably the species now described.

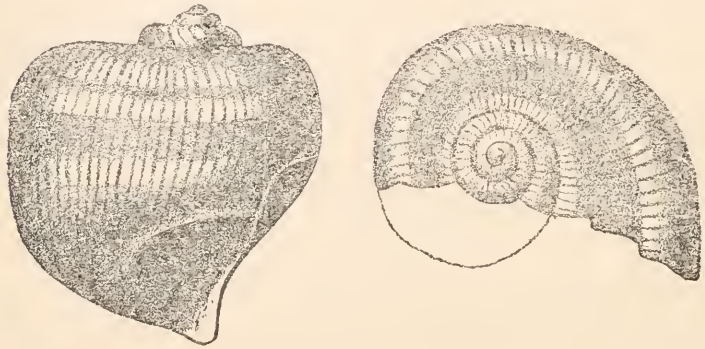
AN ORDOVICIAN GASTROPOD RETAINING COLOR MARKINGS.

BY PERCY E. RAYMOND.

While examining some small fossils collected in the Chazy, (lower Ordovician), limestone at Valcour Island, New York, the writer was surprised to find two small specimens of *Straparollina harpa* Hudson, which retain with remarkable distinctness the lines of color markings and possibly some trace of the original colors. The specimens are very small, the larger being less than one quarter of an inch in diameter. The body color of the shells is a light yellow, which is the prevailing color of the fossils in the particular stratum from which these specimens were taken. Around the top of the body-whorl, ad-

* Thus, *P. cirratus* White is extremely suggestive of *P. vortex* and *P. spirorbis;* other species recall *P. contortus.*

joining the suture, is a narrow, brownish gray band. Below it is a band of the yellow body color, and then, about the middle of the whorl, another brownish-gray band, more deeply colored than the one on the top of the whorl. Below this principal band is another light yellow band, and adjoining the umbilicus, the color is orange. The position of these bands is shown on the accompanying figures.



Straparollina harpa Hudson, × 10.

The yellow color is undoubtedly due to the iron of the decomposed limestone from which the fossils were obtained, but the brown tints may give some hint of the original coloring of the revolving bands.

These are probably the oldest shells on which color markings have been observed, dating as they do, from Middle Chazy times, (*Maclurites magna* fauna). The oldest instances of color preservation previously recorded in America are those reported by Professor O. C. Marsh, and Dr. Theodore G. White. Professor Marsh described (Proc. Am. Assoc. Adv. Sci. xvi, p. 326, 1868) certain markings on the shell of a specimen of *Endoceras* (*Cameroceras*) *proteiforme* Hall from the Trenton formation in New York. Dr. White mentions (Trans. N. Y. Acad. Sci. vol. xv, p. 85, 1896) two specimens of *Holopea symmetrica* Hall from the Black River formation of the Rathbone Brook, N. Y., section, which preserved the original shell material, and one showed the iridescent lustre of pearl.

Quite a number of cases of color preservation have been recorded from the Devonian and Carboniferous, but examples from the older formations are exceedingly rare.

Carnegie Museum, Pittsburgh, Pa.

SHELLS OF PRINCE EDWARD ISLAND.

BY GEO. H. CHADWICK.

The following list has been compiled from data supplied by Mr. Charles Ives, of Miscouche, an intelligent resident student of the natural history of Prince Edward Island. The asterisk indicates that specimens have been examined by me.

* *Urosalpinx cinerea* Say. Northumberland Strait, deep water, quite rare, but large.

* *Purpura lapillus* Linn. Carleton Head, plentiful.

Nassa trivittata Say. Northumberland Strait, rocky bottom in deep water.

Ilyanassa obsoleta Say. Bedeque Bay, very abundant on mud flats.

* *Lunatia heros* Say. Bedeque Bay and Northumberland Strait, abundant.

* *Lunatia triseriata* Say. Bedeque Bay, common. (The fine suites of these two forms fully support Mr. Ives' contention that they are distinct, as maintained by many writers, notably Dr. Gould.) The dead shells of *Lunatia heros* usually contain * *Eupagurus acadianus* Benedict.

* *Crepidula fornicata* Say. Bedeque Bay, common.

* *Crepidula plana* Say. Bedeque Bay, common in Natica shells.

* *Turbonilla interrupta* Totten, var. *fulvocincta*, Jeffreys. Bedeque Bay, very rare.

Litorina littorea Linn. Bedeque Bay, very abundant.

Litorina palliata Say. Carleton Head, Northumberland Strait.

* *Tornatina canaliculata* Say. Bedeque Bay, not common.

Planorbis trivolvis Say. "Wright's mill-pond."

* *Ensis directus* Conrad. Everywhere plentiful in sandbanks and shoals.

* *Cyrtodaria siliqua* Spengler. Off Richmond Bay, common in codfish.

* *Mya arenaria* Linn. Bedeque Bay, abundant.

* *Pandora gouldiana* Dall. Bedeque and Richmond Bays, scarce.

* *Spisula solidissima* Dillw., var. *curta* Gould (?). Bedeque Bay, not very numerous; formerly abundant.

Venus mercenaria Linn. Bedeque and Richmond Bays, plentiful.

* *Petricola pholadiformis* Lamarck. Bedeque Bay, very rare.

* *Anodonta cataracta* Say. Brook south of Bedeque Bay, common

* *Anodonta marginata* Say. With preceding and at Barlows, common.

* *Mytilus edulis* Linn., var. Bedeque and Richmond Bays, on oyster beds.

Modiolus modiolus Linn. Northumberland Strait, rare and in deep water.

* *Modiolus demissus* Dillw., var. *plicatulus* Lam. Abundant in all salt-marshes.

Ostrea virginica Gmel. Bedeque and Richmond Bays, very abundant.

Pecten gibbus L., var. *borealis* Say. Richmond Bay and Northumberland Strait, not very abundant.

NOTE ON SOME FORGOTTEN MOLLUSK-NAMES.

BY WILLIAM H. DALL.

In preparing my report on the land and fresh-water mollusks of Alaska and adjoining regions for the Harriman Expedition series (now published), I searched the available literature for data on the nomenclature of *Planorbis*, and supposed I had gathered references to all names which had been applied to members of that group above the rank of species. A chance remark by von Martens caught my eye while searching the Malakozoölogische Blätter a few days ago for something else, and following up the clue, I came upon a group of names given by Benson in 1841, but not published until 1855, which do not occur in any nomenclator I have been able to examine. As it seems eminently desirable that such mavericks should be duly recorded, even when they do not supersede others more familiar, I take that duty upon myself.

In the Journal of the Asiatic Society of Bengal, volume xxiv, part 2, 1855, is published a report on the shells of Chusan which had been prepared in 1841, but never before put in type. It contains certain new generic names which have found their way into the nomenclators, viz., *Incilaria*, *Batillaria* and *Laguncula*. In addition to these there is a revision of the subdivisions of the genus *Planorbis*, to which I have never seen any reference, and von Martens seems to have been the only person who has ever cited any of the names there given, and he mentions only *Helicorbis*.

They are as follows: *Helicorbis* Benson, subgenus of *Planorbis*, to which are referred *Pl. nitidus* of Gray's Turton, *Pl. hemisphærula*, and *Pl. umbilicalis* Benson; this group is equivalent to *Hippeutis* Agassiz, 1837. *Trochorbis* Benson is based on *Pl. trochoides* Benson, which is a typical *Segmentina*, well figured by Hanley and Theobald in the Conchologia Indica, p. 18, pl. xxxix, figs. 4–6, 1876. As *Segmentina* dates from 1817, it follows that Benson's name is synonymous. Lastly *Omalodiscus* Benson is proposed ostensibly for the group called by Swainson *Spirorbis* (1840, not *Spirorbis* Daudin, *Vermes*, 1800), but the species mentioned under it belong respectively to *Tropidiscus* Stein, 1850, and *Gyraulus* Agassiz, 1837. If we regard the contents of the group as wrongfully referred to it and take the name merely as a substitution for the preoccupied *Spirorbis* (of which the type was *Pl. rotundatus* Poiret), it may be applied to a valid section of *Planorbis*, but if we regard the contents only, the name must be considered a synonym. Under *Helicorbis* the only species for which a figure is cited is *Pl. nitidus* of Gray's Turton (= *fontanus* Lightfoot) which was already the type of Agassiz's *Hippeutis*, 1837. The others also belong to *Hippeutis*, but approach more nearly in form to *Drepanotrema* Crosse and Fischer, 1880.

While referring to this paper of Benson's it may be mentioned that his genus *Laguncula*, which is described in it, and has been generally referred to the *Assimineidæ*, but I believe never figured, resembles a very young thin-shelled *Lanatia*, with a thin horny pauci-spiral operculum recalling that of *Chondropoma*. On the whole I suspect it more nearly approaches *Cremnoconchus* than *Assiminea*, and may eventually be referred to the *Litorinidæ*. It cannot properly be referred to the *Viviparidæ*, where it was placed by H. and A. Adams, and has none of the shell characters of *Assiminea*. The aperture, while slightly expanded, does not show, in specimens sent from China by Hungerford, anything which may be strictly termed a reflected peristome, and there is no thickened ledge inside the mouth or shelly deposit on the operculum.

SAMUEL HART WRIGHT.

We regret to announce the death of Dr. Samuel Hart Wright, father of Mr. Berlin H. Wright. Doctor Wright was born Febru

ary 18, 1825, and died at his home in Penn Yan, N. Y., October 7, 1905.

"At the age of twenty, while struggling to gain a livelihood from the soil, the subject of this sketch had the fires of educational enthusiasm lighted. Two carpenters employed on the farm carried books on astronomy and mathematics in their chests and brought them out nights for study and discussion. Participation in this evening and noon-hour work resulted in a fixed determination by the boy to possess books of this character and to master them. Books accompanied him into the field; when the horses were resting new problems were fixed in the mind and when following the horses the solutions were worked out mentally.

"When added responsibilities began with wife and family, increased effort was put forth and directed towards mathematical astronomy. In 1848 after three years of close application, the first set of astronomical tables was brought out, but no purchaser found. This was repeated for 1849 and again for 1850, when they were sold to the *New York Tribune*—the first 'Whig Almanac.' Thereafter the business increased. In 1876 his son, Berlin H. Wright succeeded to this business, and other branches of science claimed increased attention, especially microscopy. Meanwhile, he studied medicine and was a practitioner until 1870, when deafness came upon him.

"The study of botany was begun in 1856 and he became an authority in this branch, as the great herbarium he left testifies. During the last two decades, the study of pure mathematics claimed most of his time, though he did much in surveying. In pursuit of recreation, with his son and grandsons he became enthusiastic in geology and conchology.

"A large library of standard reference works along all these lines and in general literature was brought together. Among these he spent his last years and was happy."

Mr. Wright contributed a number of interesting articles on the Unionidæ of the Southern States, among which may be mentioned: "Notes upon the Unionidæ of Southern Florida," (*The Conchologist's Exchange*, vol. ii); "Unionidæ of Georgia, Alabama, South Carolina, and Louisiana in South Florida," (THE NAUTILUS, vol. iv), and "Contribution to the Knowledge of United States Unionidæ," (THE NAUTILUS, vols. x and xi). In the latter paper seven new species were described. C. W. J.

NOTES.

Canadian oysters.—It is reported from Halifax that there is danger that the famous oyster-beds of Prince Edward Island, which supply the Malpeques, the great favorites in the leading Canadian markets, will be wholly exhausted in ten years at the present rate of fishing.

This is in part due to the fact that nearly all the Canadian oysters are shipped in the shell. In the United States the fishermen shell a great many of the oysters and return the shells to the beds, which is a distinct aid to propagation.

The Canadian government is exerting itself in restocking the oyster beds which, however, are being depleted rapidly.—*Boston Globe.*

Paludestrina salsa, Pils., described in the December Nautilus, occurs abundantly at Branford, Conn. At one locality, 3 miles from the Sound where a brook enters the marsh it occurs on stones and decaying vegetable matter. The form here is more slender than the type. Another locality reveals it in ditches in the marsh near the railroad. Here it is larger than the Cohasset form, and it occurs on the vegetation floating in the ditch.—Henry W. Winkley.

Note on Vitrina Pfeifferi Deshayes. This species is cited in Pfeiffer's Mon. Heliceorum Viventium, vol. iii, p. 7, 1853. I did not look it up further, but added the date, which Dr. Pilsbry's critical eye detected as improbable, under the impression that the citation referred to Ferussac's "Prodrome" of 1822. On a second inspection I suspect that Pfeiffer's "Fer. Lim." refers to the "Histoire des Moll. Terrestres," a work not accessible to me here, but to which Deshayes made contributions, 1839–41.* Deshayes gives exactly the same references as Pfeiffer, in his MS. catalogue of *Vitrina* in my possession, and as the name had entered into literature a second time, as early as 1853, there can be no doubt as to its being prior to Newcomb's *pfeifferi* of 1861.

I may add for the benefit of those who may like to make correc-

* The name *Vitrina pfeifferi* was proposed by Deshayes in Férussac's *Histoire*, ii, p. 96^{24}, 1851, in the text under *V. angularis*, for some figures in Férussac, plate 8 F, pp. 18–22, of a *Vitrina* supposed to be new, but which Deshayes had never seen. There is no statement of locality. It was omitted from the index of the work, and has not been recognized by any subsequent author. The figures look like almost any *Vitrina*.—Ed.

tions in their private copies of the "Land and Fresh Water Mollusks of Alaska," that, since it was stereotyped, it has come to my knowledge that Benson proposed some new names for subdivisions of the genus *Planorbis* as early as 1855, which he seems afterward to have abandoned and which have not been included in the Nomenclators. They were published in the Journal of the Asiatic Society of Bengal, and two of them appear to be prior to names adopted by me in the work above cited. *Omolodiscus* Benson, will therefore take the place of *Paraspera* Dall (l. c., p. 82), and *Helicorbis* Benson, of *Drepanotrema* Crosse and Fischer, 1880.—Wm. H. Dall.

PUBLICATIONS RECEIVED.

Some West American Shells, including a new variety of *Corbula luteola* Cpr., and two new varieties of Gastropods. By Mrs. M. Burton Williamson. (Bull. of the South. Cal. Acad. of Sciences, Vol. iv, No. 8, p. 118.) This interesting paper adds several species to Prof. Keep's list, making the number of species to date from the West Coast 1,377. *Corbula luteola* var. *rosea*, *Drillia moesta* var. *maculata*, and *Calliostoma canaliculatum* var. *parvum*, are described as new.

On a Large Example of Megalatractus aruanus L. By Charles Hedley. (Records of the Australian Museum, Vol. vi, p. 98, pl. 21 and 22.) This large shell, which the author says "appears to be the largest recent Gastropod," has a weight of ten pounds twelve ounces, with a length of $22\frac{3}{4}$ inches, the loss of the styliform embryo, etc., curtailing its total length by $\frac{3}{4}$ of an inch. We beg to state that this Australian giant has a rival on our Florida coast, *Fasciolaria gigantea* Kiener. I have seen a living specimen of this shell measuring 23 inches in length. Mr. Chas. T. Simpson, in his "Contributions to the Mollusca of Florida" (Proc. Davenport Acad. Nat. Sci., v, 51), says: "On the Keys I have seen dead shells two feet in length. The largest Gastropod in the world." C. W. J.

Molluscs and Brachiopods of Ballynakill and Bofin Harbors, County Galway, and of the Deep Water off the West and Southwest Coasts of Ireland. By E. R. Sykes. (Ann. Rep. Fish., Ireland, 1902–03, Pl. ii, App. iii [1905].) An interesting faunal list, with copious notes on the various species.

The Nautilus.

Vol. XIX. FEBRUARY, 1906. No. 10.

VITREA RHOADSI AND SUCCINEA RETUSA MAGISTER.

BY HENRY A. PILSBRY.

Illustrations of the two species named below have recently been prepared for Mr. Bryant Walker's hand book of the Mollusca of Michigan. We are indebted to Mr. Walker for the use of these figures here, in advance of his own publication.

Fig. 1.

Vitrea rhoadsi Pils. Fig. 1.

The figures represent one of the cotypes from White Pond, Warren Co., N. J. (Nautilus, xii, 101). Mr. Walker has extended the range by identifying the species from Michigan, Ontario, Virginia, and other places (Nautilus, xiv, 8). Specimens have been sent from Buckfield, Oxford Co., Maine, by Mr. John A. Allen.

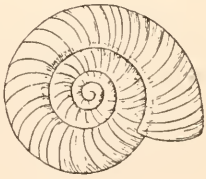
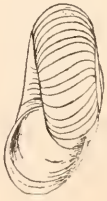


Fig. 2.

Succinea retusa magister Pils. Fig. 2.

One of the cotypes from Rock Island, Ill., is here figured. This fine, large form attains the size of *S. concordialis*. The latter differs from it by having a very full, sack-like base. Described in Nautilus, xii, 103.



SHELL-BEARING MOLLUSCA OF FRENCHMAN'S BAY, MAINE.

BY DWIGHT BLANEY.

In addition to the one hundred and twenty-seven species and five varieties of Mollusca collected in Frenchman's Bay, Maine, by the writer during 1901–4 (a list of which was published in the Proceedings of the Boston Society of Natural History, vol. 32, no. 2, pp. 23–41, 1904), the following six species (one of which is new to science) and two varieties were added during the summer of 1905, making a total of one hundred and thirty-three (133 plus 7 varieties) species and seven varieties from this locality.

Astarte quadrans Gould.

One valve, identified by Dr. W. H. Dall, dredged off Great Head, Ironbound Island.

Astarte portlandica Mighels.

Many valves, and a few live specimens dredged off Heron Island on shelly bottom, 10 fath. From study of these specimens Dr. Dall writes us that he now thinks this "a good species as described by Mighels in 1843, provided a larger series of '*A. quadrans*' than I have been able to consult does not show gradations between the two species."

Cochlodesma leanum Couthouy.

Two valves dredged off Seal Cove, Ironbound Island, about 15 fath. This shell which is commonly found much further south will probably be found alive in the warmer waters up the bay.

Sipho stimpsoni Mörch, var. *liratulus* Verrill.

A few have been dredged the past few years at the same stations as the "*stimpsoni*," but were only lately identified for us by Prof. Verrill and Miss Bush. They were all young specimens.

Columbella (Astyris) *dissimilis* Stimpson.

Columbella zonalis Linsley.

Two specimens dredged off the Spar Landing, Ironbound Island, 15 fath., shelly bottom, October, 1905. One alive.

Crepidula fornicata (Linné).

Found on stones of Soward's Island at very low water. Verrill,

U. S. Fish Comm., p. 650, 1871–72, says: "Has not been found east of the Kennebec River, Maine.

Solariella obscura (Couth.), var. *bella* Verk.

Machaeroplax obscura var. *bella* Verrill, Trans. Conn. Acad. v, p. 531. A few dredged off Ironbound Island, and identified for us by Prof. Verrill and Miss Bush. "Variety '*bella*' is the predominant form at Eastport, Me., and in the Bay of Fundy."—Verrill, *op. cit.*

Tonicella blaneyi Dall.

For description see Pro. Biol. Soc., Wash., vol. xviii, p. 203, and NAUTILUS, vol. xix, no. 8, p. 88, pl. iv, 1905. Dredged near station 22, in about 20 fathoms.

The following species, whose occurrence in Frenchman's Bay was based on the finding of dead specimens or valves, have since been found alive:

Thracia truncata Mighels and Adams.

Pandora (*Clidiophora*) *gouldiana* Dall. Off Ryefield Point and Heron Island; 10 fathoms.

Ensis directus (Conrad). Off Ryefield Point, 10–15 fathoms; shelly mud. Our live specimens usually cut in two by the dredge.

Velutina zonata Gould. Off Ryefield Point, Aug., 1905.

Marsenina glabra (Couth.) Station 19, 20 fathoms. Verrill, *op. cit.*, p. 5, 7, says: "This species is not uncommon at Eastport, Me."

DESCRIPTION OF NEW SPECIES OF ACHATINELLIDAE FROM THE HAWAIIAN ISLANDS.

BY D. D. BALDWIN.

Partulina flemingi, n. sp.

Shell dextral, minutely perforated, somewhat solid, elongately conical, apex acute; surface shining, striated with delicate incremental striæ, and under a lens exhibiting very close delicate decussating spiral lines which extend almost to the apex. Color white or brownish-white, with two dark-brown bands, one bordering the suture, and one at the periphery continued on the spire just above the suture; in many examples the sutural band is absent. Whorls 6, narrowly

margined above, somewhat convex; suture moderately impressed. Aperture oblique, oval, white, the outside band visible within. Peristome acute, slightly thickened within, dark-brown, the columellar margin reflexed over the minute perforation. Columella terminating in a strong, plaited, pinkish-brown, projecting tooth.

Length, 19; diam., 9 mm.

Habitat, Nahiku, East Maui.

Animal when extended in motion as long as the shell. Mantle intensely black with a narrow white band encircling the outer edge. Foot above and below very light-brown, granulated above. Tentacles long and slender, slate color.

There occurs also a pure-white form of the shell without any bands.

We dedicate this shell to Mr. D. T. Fleming of Maui, to whom science is indebted for its discovery.

Partulina lemmoni, n. sp.

Shell sinistral, imperforate, solid, acuminately ovate conic, apex acute; surface shining, striated with fine growth-lines, and under a lens showing close, delicate, decussating spiral striæ; nuclear whorls smooth. Color white, variously striped with numerous dark-brown lines and bands, the constant ones being two broad bands, one encircling the base, and the other at the periphery, continued on the middle whorls above and below the suture, obsolete above; apex white. Whorls 7, narrowly margined above, convex; sutures deeply impressed. Aperture oblique, oval, white, exhibiting the outside coloring within. Peristome acute, thickened within, narrowly reflexed. Columella terminating in a long, flexuous, white plait.

Length, 23; diam., 11½ mm.

Habitat, Nahiku, East Maui.

Animal in motion as long as the shell. Mantle brownish-black, mottled with white streaks, with a broad yellowish-brown border somewhat interrupted. Foot above and below very light-brown. Tentacles slate color.

Named in honor of Mr. N. E. Lemmon, of Nahiku, who discovered it.

Partulina carnicolor, n. sp.

Shell dextral, minutely perforated, solid, acuminately oval conic, apex subacute; surface lusterless, marked with delicate incremental

striæ, and under a lens exhibiting a fine pattern of decussating spiral striæ; nuclear whorls faintly decussated. Of a uniform brown color, a narrow white line below the periphery, which enters the aperture, and a very narrow white line traversing the suture. Whorls 6, slightly marginate above, a little convex; suture lightly impressed. Aperture oblique, oval, livid-white, showing the exterior coloring within. Peristome acute, expanded, columellar column broadly reflexed. Columella white, terminating in a well developed, flexuous fold.

Length, 25 ; diam., 14 mm.

Habitat, Nahiku, East Maui.

Partulina kaaeana, n. sp.

Shell sinistral, subperforated, solid, globose, with a conical spire, apex subacute; surface rather lusterless, covered with rather coarse, wavy growth-lines, and under a lens exhibiting close and delicate decussating spiral lines; nuclear whorls faintly decussated. Color ashy-brown, with a light brown band just below the periphery and entering the aperture; whole surface covered with minute longitudinal white flecks or streaks; apex tessellated white and brown. Whorls 6, not margined above, flatly convex; suture lightly impressed. Aperture a little oblique, oval, livid-white, showing the outside coloring within. Peristome acute, slightly thickened within, expanded, columellar margin reflexed, light brown on both face and the reverse. Columella white, terminating in a strong, plaited, projecting tooth.

Length, 21; diam., 13 mm.

Habitat, Mt. Helu, 4000 ft. alt., West Maui.

Animal extended in motion longer than the shell. Mantle brownish-black, with outer edge bordered with a narrow white line. Foot below and side light slate color. Head above and tentacles dark slate and granulated.

This shell was found on a mountain-peak quite isolated from the main mountain mass of West Maui. We dedicate it to Mr. W. F. Kaae, who seems to have been the only one in quest of shells who has ventured to climb this lonely peak. He found the shell in company with *Perdicella ornata* Nc. a species supposed long since to have become extinct.

(*To be continued.*)

NEW AND LITTLE KNOWN SPECIES OF AMNICOLIDAE.

BY BRYANT WALKER.

SOMATOGYRUS TENNESSEENSIS n. sp. Pl. 5, fig. 8.

Shell subglobose, perforate, greenish-yellow, smooth with fine lines of growth. Spire short, obtuse; whorls $3\frac{1}{2}$, those of the spires depressed, rounded, with an impressed suture; body-whorl large, inflated, regularly rounded. Aperture large, transversely expanded, sub-triangular, broadly angled above, and somewhat flattened below. Columella narrow with a moderately heavy, rounded, callus, which extends over the parietal wall and, below the minute umbilicus, is separated by a wide axial groove. Lip thick and sharp.

Alt. $4\frac{1}{2}$, diam. 4.25 mm.

Shoal Creek, Florence, Tenn. Types (No. 22377 Coll. Walker). Cotypes in the collections of the Academy of Natural Sciences and A. A. Hinkley.

This species was at first taken to be a form of Conrad's *S. pumilus*. But on removing the animal it was found to differ so radically in the character of the columella as to forbid its reference to that species. Compared with the specimens of that form from Cahatchee Creek, Ala., while of a similar contour, it differs in being larger, thinner, with a more expanded aperture, and in the narrow, rounded columella.

SOMATOGYRUS ALDRICHI, n. sp. Pl. 5, fig. 9.

Shell subglobular, perforate, greenish-yellow, smooth, with very fine, but distinct, lines of growth. Spire very short, depressed, obtusely rounded. Whorls $3\frac{1}{2}$, those of the spire slightly convex with an impressed suture ; body-whorl very large, inflated, with a strong carina in front below the periphery, which emerges from below the upper insertion of the lip, and continues about two-thirds around the whorl, where it gradually disappears, not reaching the lip ; the upper portion of the whorl above the carina is regularly, but not strongly convex, but below it is obliquely flattened toward the impressed base of the axis. Aperture large, subcircular, obtusely angled above and regularly rounded below. Columella concave, with a broad, heavy, flat callus, which extends over the parietal wall, and is separated below the perforation by a broad axial groove. Lip sharp, thickened within as it approaches the base of the columella

Alt. 3½, diam. 3½ mm.

Types (No. 21944 Coll. Walker), from the Coosa River, Chilton Co., Ala. Also Catawba River, Ala. Cotypes in the collection of T. H. Aldrich. A single specimen of this extraordinary species was detected in a set of *S. georgianus* from the Catawba River, in the Lewis collection, when my former paper on *Somatogyrus* (Naut., 17, p. 140), was in preparation. But it was of such unusual form that it seemed more likely to be a monstrosity than a distinct species. Recently, however, Mr. T. H. Aldrich has submitted a set from the Coosa, which are remarkably uniform, and leave no doubt but that it is entitled to specific recognition. The discovery by Mr. Hinkley of another but very distinct carinated form in the Tennessee River at nearly the same time is an interesting coincidence, and, like the similar case of *S. umbilicatus* and *strengi*, affords a striking example of evolution along parallel lines in two different drainage systems.

Somatogyrus pumilus (Conrad). Pl. 5, fig. 10.

Conrad's original description of this species is very meagre and no dimensions are given. His figure subsequently published in the American Journal of Conchology V, Pl. 15, fig. 5, is on too small a scale to be entirely satisfactory. Fortunately, however, his type has been preserved in the collection of the Philadelphia Academy of Natural Sciences, and until now has been the only specimen known. Recently Mr. T. H. Aldrich has submitted a small form from Cahatchee Creek, Shelby Co., Ala., which seemed to be very similar. Dr. Pilsbry has kindly compared them with the type and writes "they are not quite *pumilus*, as the columella is decidedly too wide and calloused." A careful comparison made during a recent visit to Philadelphia, however, satisfied us both that these specimens could not be distinguished from Conrad's species. In the absence of topotypes, it seems desirable to describe and figure the Cahatchee form for comparison with the new species that have recently been described from the same region.

Shell small, sub-globular, imperforate, thick, solid, pale-green, becoming somewhat yellowish towards the aperture, smooth, with very fine growth-lines. Spire depressed, obtuse, whorls probably 3–3½ (apex eroded), those of the spire slightly convex with a well impressed suture; body-whorl large, inflated, regularly rounded. Aperture subcircular, broadly angled above, regularly rounded below,

columella concave with a heavy, broad, flat callus which extends over the parietal wall, and separated below the axis by a rather wide axial groove. Lip simple but thickened within, especially below.

Alt. $3\frac{1}{2}$, diam. $3\frac{1}{2}$ mm.

This species is distinguished from other described species with an axial groove by its small size and sub-globular shape. It is most closely related to *S. tennesseensis*, but differs in being smaller, more globular; more solid, smaller aperture, narrower axial groove, and broad, flat columella. *S. excavatus*, which is about the same size, is too entirely different in shape to be confounded with it.

SOMATOGYRUS PENNSYLVANICUS Walker. Pl. 5, figs. 17 and 18.

In the Spring of 1905, I collected a few specimens of this species under stones at the upper end of Island Park in the Potomac River at Harper's Ferry, Va. The occurrence of this species in a different drainage system is of interest. The shells are rather larger than those of the original lot from Columbia, Pa., and exhibit the two forms noticed in *S. virginica* and *quadrata*. The dimensions of the specimens figured are:

Fig. 17, alt. 3.75, diam. 2.5 mm.

Fig. 18, alt. 4, diam. 3 mm.

PYRGULOPSIS MISSISSIPPIENSIS (Pils.). Pl. 5, fig. 15.

Pyrgula scalariformis mississippiensis Pils., American Naturalist, January, 1886, p. 75.

Pyrgulopsis mississippiensis Call and Pilsbry, May, 1886.

One of the most interesting discoveries made by Mr. Hinkley during his trip was the finding of this species living in great numbers in Shoal Creek near Florence, Ala. This is the first time the species has been found alive; the original specimens having been all dead shells. We are thus enabled to supply two particulars in which the original description was necessarily defective. The epidermis is of a clear yellowish-horn color and the operculum agrees with the generic diagnosis in being "ovate, thin, corneous, spiral, with the polar point well forward and approximating the columella." The apices of all the mature Shoal Creek specimens were eroded.

AMNICOLA PILSBRYI, n. sp. Pl. 5, figs. 11 and 16.

Shell very small, umbilicate, globose, conic; light horn-colored,

smooth, with faint growth-lines; spire somewhat elevated, apex obtuse; whorls $3\frac{1}{2}$–4, regularly rounded and somewhat inflated; body-whorl large; suture well impressed. Aperture subcircular, slightly angled above; peristome nearly continuous, being appressed to the body-whorl for only a short distance.

Fig. 11. Alt. 2.25, diam. 2 mm.

Fig. 16. Alt. 2.25, diam. 1.75 mm.

Types (No. 3354 Coll. Walker) from Rockford, Ills. Also from Meyer's Lake, Canton and the Ohio Canal, New Philadelphia, O. Cotypes in the collection of the Academy of Natural Sciences.

This little species in years past must have been largely distributed both as *Lyogyrus grana* and *Amnicola parva*, as I have received it under these names from several different sources. From the former it differs generically, and from the latter in its much smaller size and regularly rounded whorls. It is in general appearance very much like a minute *A. limosa*, but can at once be separated by its diminutive size. As in many species of *Amnicola*, there are two forms, one more slender than the other. From *A. walkeri* (pl. 5, fig. 12, cotype, High Island Harbor, Mich.), which is about the same size, it differs in being more globose, with less convex whorls, the suture being not so deeply impressed, larger aperture and the appression of the inner lip to the body-whorl. Named in honor of Dr. H. A. Pilsbry.

Amnicola augustina Pils. Pl. 5, figs. 13 and 14.

Mr. Hinkley collected this species at Tuscumbia, Ala. Dr. Pilsbry, who kindly compared specimens with the types, writes: "It seems to me too close to *augustina* to be specifically separable, though there are differences. Your shells have the whorls a trifle less convex, the sutures therefore somewhat less deeply constricting, and the narrow phase (males?) is narrower than the corresponding form in *augustina*, but I would prefer to attribute what differences there are to local causes."

As *A. augustina* has not been figured, and the discovery of Mr. Hinkley not only widely extends its range, but adds a new species to the fauna of Alabama, it seems of sufficient interest to figure the Alabama form and to record its occurrence at Tuscumbia.

Fig. 13. Alt. 3, diam. 2 mm.

Fig. 14. Alt. 3.25, diam. 2.25 mm.

NEW VARIETIES OF NORTH AMERICAN PISIDIA.—2.

BY V. STERKI.

(*Continued.*)

Pisidium variabile Pr. var. *brevius* n. Much shorter than the usual form, oblique, moderately to well inflated, beaks comparatively large, generally slightly flattened on top; color darker; so far as known, the mussels are usually smaller. This Pisidium is considerably different from the "typical" form, and an analogue of *P. compressum* var. *confertum*.

Hab.: Michigan: Houghton Lake; Gogebic Lake and Slate River to same, Carp River and Lake, Ontonagon Co., Walker; Crystal Lake (Dr. Kirkland); Minnesota: Clear Water Lake (Sargent); Keewatin: Attawapiskat River (McInnes, sent by Whiteaves).

Var. *hybridum* n. Smaller than average *variabile*, of nearly the same shape; but the shape of the beaks, surface appearance, color and opacity of the shell are those of *Pis. æquilaterale* Pr. This is an interesting form, and might be taken for a hybrid between the two species, both of which were found at the same places; but it is markedly constant, so far as known.

Vicinity of Mohawk, N. Y.: Wide Water Canal (Jas. Lewis collection, now Mr. Bryant Walker's), Chepachet Pond (received from Mr. H. E. Sargent).

There are some other forms of *Pis. variabile*, rather characteristic and constant, and with more material will probably prove real varieties. Even the more typical form is rather variable with respect to size, shape, striation, color, thickness of shell and hinge.

Pisidium noveboracense Pr. The form regarded as typical seems to be common in New York, Pennsylvania and Ohio, prevalent in springs and small brooks. But the species is almost endlessly variable and seems to readily respond, in that respect, to various kinds of habitat, so that it often seems impossible to decide whether a certain form has to be ranged under it or not. But there are a number of forms characteristic and more or less constant, and must be described as varieties.

Var. expansum, n. Anterior part of the mussel higher; supero-anterior slope more curved, anterior end more rounded; postero-inferior curve generally broader; outlines in general more rounded; more regularly inflated, beaks less prominent, young specimens less

inflated comparatively, and of characteristic shape; surface with very fine, more regular striation, and generally more even dullish; color grayish to brownish, whitish to straw-colored in the young but soon changing.

Various places in Michigan: Grand river, Lamberton creek, a small stream, etc. (Kent co., Dr. Kirkland); a very similar form from a ditch on Cameron Run near Alexandria, Va. (Sterki).

Var. elevatum, n. Smaller than the type, shorter, well inflated, anterior part higher, anterior end more rounded; superior margin, slightly or scarcely curved with sharply projecting angles before and behind, which are, however obsolete in some specimens; color straw to yellowish-horn. This is quite a characteristic form but seems connected with the type by intermediate specimens.

Creek and pond at Castalia, Erie co., Ohio (Sterki), Joliet, Ill. (Ferris and Handwerk); similar forms from other places.

Var. *quadrulum* n. Smaller, slighter, of more quadrate outlines but with no sharp projecting angles; supero-anterior slope rather steep; beaks not much prominent; surface with rather fine, somewhat irregular striæ; color pale to grayish-horn; shell thin and somewhat translucent, hinge rather slight.

This Pisidium appeared to be distinct from *noveboracense;* yet intermediate forms may be found. It is a form of ditches and marshes, and widely distributed, as it seems; quite common, *e. g.*, in the vicinity of New Philadelphia, Ohio (Sterki).

A larger form, stouter, higher, more inflated, with the shell scarcely translucent, was called *proclive;* it may prove to be a real variety. Ditches, New Philadelphia, O., and similar forms from other places.

Var. *lineatum* n. Smaller, shorter, somewhat oblique, moderately inflated, especially so towards the inferior margin, somewhat triangular in outlines; beaks narrow, little prominent; surface with rather fine, subregular striæ, and usually with a few fine lines, dark lines of growth; color straw to yellowish, horn to reddish; shell and hinge rather slight.

Reed Lake, Michigan (Dr. Kirkland), and similar forms from elsewhere. This is somewhat analogous to *Pis. compressum* var. *rostratum*, of the same lake, and it may be noted that the same is inhabited by nearly typical forms as well as several rather different forms, or varieties of both species; at least one of each has not been described here.

Var. *fraternum*, n. Less elevated; superior and inferior margins slightly curved, and the former long; beaks not much prominent; surface with irregular, shallow striæ, shining; color horn to yellowish-horn, usually in irregular, alternating zones, also more or less translucent. In its surface appearance it resembles the "eastern form" of *Pis. abditum* Hald.

New Philadelphia, and Akron, Ohio (Sterki); similar but smaller forms from Kent Co., Mich. (Dr. Kirkland).

Var. *alabamense*, n. Higher; beaks quite prominent; superior margin more curved and sloping down into the anterior and posterior without or with slightly prominent, rounded angles; mussel rather large and well, regularly inflated; surface with rather sharp, subregular striæ, slightly shining to dull, and microscopically rugulose; color yellowish to grayish-horn; size, long. 6, alt. 5, diam. 4.6 mm., a few even larger, but most specimens are smaller.

Hab.: Alabama, along the Coosa river, common (H. H. Smith), Tennessee river (Sargent, Hinkley), Columbus, Mississippi (Hinkley).

This Pisidium is rather variable. While most specimens are as described, and appear to represent a distinct species, others approach the "typical" New York and Ohio form in shape.

NOTES AND NEWS.

A New Locality for Planorbis nautileus Linne.—While identifying a lot of shells recently for Dr. William A. Nason of Algonquin, Illinois, a single specimen of *Planorbis nautileus* was discovered in a lot of other small Planorbes,—*parvus*, *albus*, *deflectus*. The single specimen is rather large, 2½ mill. in diameter, and the ribs on the base of the shell, which give it its strong nautiloid appearance, are very large and distinct. The flat upper surface is also conspicuous. This habitat, Algonquin, Illinois, adds a new southern and western locality to the range of this interesting species.—Frank Collins Baker.

Errata.—Nautilus. Jan. 1906, p. 101, line 5, for "ones" read "one;" p. 101, line 7, for "Ramalley read "Ramaley."—T. D. A. Cockerell.

The Nautilus.

Vol. XIX. MARCH, 1906. No. 11.

ON BIFIDARIA PENTODON AND ITS ALLIES.

BY E. G. VANATTA AND H. A. PILSBRY.

The group of *B. pentodon* has been for many years the subject of much perplexity to conchologists, on account of the great variability of the shells in size, shape, and dentition of the aperture. It is easy to select forms which seem perfectly distinct species, but when large series are examined, there is always a residuum of intermediate specimens which can as well be placed in one as another of the selected groups. The difficulty is increased by the fact that practically all of the forms occur over the whole area of the group, though one or another of them may predominate in any given locality. This led Dr. Gould to the conclusion that *P. curvidens* and *tappaniana* are forms of *pentodon* (Boston Journal N. H. IV, 1844, p. 35), an opinion adopted by Binney, and commonly prevalent until recent years, when Dr. Sterki revived *curvidens*. It is the purpose of this article to ascertain the exact forms which have been described, and to show by figures the various modifications of form.

In all the forms the shell is of a white-corneous color and the teeth within the lip stand upon a white callus, in this respect differing from *B. pilsbryana* of the Southwest.

The following names have been applied to the group:

1. *Vertigo pentodon* Say, 1821.
2. *Pupa curvidens* Gld., 1841.
3. *Pupa tappaniana* Ward, C. B. Adams, 1842.
4. *Pupa tappiana* Ward, Pfr., 1842.
5. *Pupa cincinnatiensis* Judge, 1878.
6. *Pupilla floridana* Dall, 1885.

7. *Pupa montanella* Ckll., 1889.
8. *Pupa curvidens* var. *gracilis* Sterki, 1890.
9. *Pupa pentodon* for f. *curta* Sterki, 1894.

The original descriptions of these forms are given below, most of them in full, while of others (nos. 4–6) only the important parts are quoted.

Having examined many hundreds of specimens from all parts of the range of the species in question, it appears that there is intergradation throughout the series in a small proportion of specimens; but the vast majority of specimens fall into two groups which may be given the nominal rank of species, the proposed classification standing as follows:

B. pentodon (Say). Synonyms, *cincinnatiensis*, *curta*, *montanella*. "Form" *curvidens*, including *floridana*.

Var. *gracilis* St.

B. tappaniana (C. B. Ad.). Synonyms, *tappiana* Pfr., *pentodon* auct.

Note.—The figures are all drawn to one scale (× 13.8), and any may be accurately measured by plotting on paper a scale with the lines 13.8 mm. apart; each space then representing 1 mm. Thus fig. 1 is 1.8 mm. long.

Bifidaria pentodon (Say). Figures 1 to 41. Fig. 1 is typical.

The shell is small, varying from conic to subcylindric in shape. Teeth typically 5, of which the parietal, columellar and lower palatal are larger and compressed, the lower palatal entering a little more deeply than its fellows in the outer margin; but often subcolumellar, basal, and interpalatal denticles are developed. Figs. 1 to 8 are from Maine specimens, showing the ordinary variations. The development of a crest behind the lip varies a good deal, from weak to very strong, with all intergrades. *P. cincinnatiensis* (fig. 35, a cotype) is a small form of *pentodon*.

The increase in number of accessory denticles or teeth culminates in the form named *curvidens*, represented in figs. 9 to 15, also 3, 6, 32 and perhaps some others, as there is absolutely no line to be drawn between *pentodon* and *curvidens*. The number of teeth varies from 5 to 9 in perfectly adult shells of the same gathering from one spot. The development of an infraparietal denticle is also extremely variable in many lots, as in that from Buckfield, Me., figs. 1 to 4, 8. *P. floridana* (fig. 9, a cotype from the author) is absolutely identical with *curvidens*.

It may be stated as proven that some colonies consist of "pentodon" and intermediate forms; some of "pentodon," intermediate and "curvidens" forms; and some of the intermediate and "curvidens" forms. We have found no large gathering of wholly typical *pentodon* or entirely *curvidens*. Either form may be found with a low or high crest—this being usually more constant in any one colony than the number of teeth or the size and shape of the shell. The only theory upon which *curvidens* could be retained as a species or subspecies would be to assume that two species are living in a state of hybridism—an assumption which seems to us baseless.

Bifidaria pentodon gracilis Sterki. Figs. 16 to 27.

This is usually larger, more cylindric, with 5 teeth, though perfectly mature shells may have as few as 3 (figs. 19, 26,) or as many as 6 or 7 (figs. 16, 18, 21). It was originally described from New Philadelphia, Ohio, but those figured are from Alabama; figs. 16, 17, 21 to 27 from around Wetumpka, 18, 19, from Woodville, 20 from Big Wills Valley, coll. by H. H. Smith and H. E. Sargent. None of them has an infraparietal denticle.

While this race seems to be tangibly differentiated in the hill region of Alabama, specimens may be selected from other lots of *pentodon* which could not possibly be distinguished if mixed with the Ala. shells; for instance fig. 31, Henry Co., Ind., and fig. 33, Des Moines, Ia., both taken from lots varying in shape from long and cylindric to shorter and more conic.

The original descriptions of forms referred to *pentodon* here follow.

"*V. pentodon. Shell* dextral, subovate, whitish horn-color; *apex* obtuse; *whorls* five, glabrous, convex; *suture* not very deeply impressed; *aperture* semioval; *labium* two-toothed, of which a single very prominent one is on the middle of the transverse portion or true labium, and the other is remote, much smaller and placed in the basal angle of the columella; *labrum* regularly arcuated, tridentate, tooth nearest the base very small and placed near the smaller tooth of the columella, the two others larger, subequal; umbilicus distinct. Length less than one-tenth of an inch.

"Animal. Tentacula two, rather long and thick, cylindrical-obconic, retractile, with a rounded oculiferous extremity; two hardly elevated truncated tubercles instead of the anterior tentacula; *foot* white; *head* and neck, as far as the mantle, black.

"Inhabits Pennsylvania. The lower tooth of the labrum is sometimes obsolete." (Say, Journ. Acad. Nat. Sciences Phila., vol. 2, 1821, p. 376.)

NOTE.—*This is not the comparatively large and conic multidentate form commonly known in recent years as pentodon;* but a five- or six-toothed form which has hitherto been referred to *curvidens*.

"*Pupa curvidens*. Shell minute, ovate, but much elongated, of a spermaceti-white color; whorls five, convex, smooth, gradually diminishing to an obtuse apex; suture deeply impressed, aperture subtriangular, with the front and outer angles rounded, and the outer lip curved inwards, so as almost to make the aperture heart-shaped; the transverse margin is straight, and slightly oblique; the inner lip is also nearly straight, so that these two form a rightangle at their junction; lip widely reflected, flattened, white; throat armed with nine teeth; the longest, somewhat curved to the left, compressed and pointed, is situated on the middle of the transverse lip, and has a small one seated at its left side; at the front, nearly opposite the large tooth, almost as large and inclined to the left also, is a quadrangular, blunt tooth, more slightly curved; on the left margin are three teeth, of which the upper one is larger, and about the size of the basal tooth, of a blunt quadrangular figure; the other two are minute; on the outer lip are also three teeth, of which the two upper are very small and pyramidal; umbilicus open. Length $\frac{1}{15}$ inch, breadth $\frac{1}{40}$ inch.

"This minute species I first found under a loose stone on the ledges at Phillips Point, Lynn, near the Ocean House. * * * * Four of the teeth are very small, and would scarcely be discerned without being highly magnified, and they seem to be seated farther within the aperture; the small one on the transverse lip, the basal one, and the upper one on the right lip are liable to be wanting. So far as I can ascertain, it has not been previously described, unless several of the teeth have been overlooked. It is nearest allied to *P. pentodon*" (Gould, Report on the Invertebrata of Massachusetts, 1841, p. 189, f. 120).

"*Pupa cincinnatiensis* Judge. * * * peristome simple, heavily thickened near the margin, the callus extending over the parietal wall; aperture contracted by five prominent denticles, seated on the callus, one prominent on the parietal wall, two on the columella, the

lower being the smaller of the two, and two on the outer portion of the peristome, more deeply seated in the throat, and occasionally one or two very minute rudiments on the peristome. Length 1.56, diam. 84 mm. This shell is found on both sides of the Ohio River, near Cincinnati." (Judge, The Quarterly Journ. of Conch., p. 343, 1878.)

"*Pupilla floridana* Dall. * * * subcylindrical * * * teeth about 9, of which there are generally 3 larger than the rest, their tips nearly meeting and their bases mutually nearly equidistant; one is on the pillar, one on the body-whorl, and one on the anterior margin; on either side of the latter are two generally subequal, much smaller denticles. Lon. 1.6, lat. .75 mm. Archer, Alachua Co., Fla." (Dall, Proc. U. S. Nat. Museum, Vol. 8, 1885, p. 261, pl. 17, f. 11.)

The figure seems to have two teeth on the parietal wall, two on the columella and five in the palatal region. This is practically identical with the arrangement described under *curvidens*.

"*Pupa montanella*. A minute *Leucochila* which I have found very sparingly at about 8400 feet in West Custer Co. (Colorado), to which I have given the name *P. montanella* sp. nov., but do not describe it pending further investigations." (Ckll., The Journ. of Conch., Leeds, Vol. vi, 1889, p. 63.)

"*P. montanella*, indicated on the same page as *P. coloradensis*, proves to be a form of *P. pentodon*." (Ckll., The Brit. Nat., 1891, p. 101.)

Since no definition of any kind has been published, this name becomes an absolute synonym of *B. pentodon*.

"*Pupa curvidens* var. *gracilis*. On a gravelly bank at New Philadelphia, Ohio, there is a peculiar form of our species; long, slender, nearly cylindrical, with only 5 typical lamellæ, no accessory ones. * * * I thought it not out of place to name it var. *gracilis*." (Dr. V. Sterki, NAUTILUS, iii, 1890, p. 119.)

"*Pupa curvidens gracilis* Sterki. Scarce. New Philadelphia. A peculiar form intermediate in shape between the type and *Pupa holzingeri* Sterki. It has also been seen from Rhode Island, Tennessee and Alabama." (Sterki, The Land and Fresh-water Mollusca in the Vicinity of New Philadelphia. A contribution to the Nat. Hist. of Tuscarawas Co., Ohio, 1894.)

"*Pupa pentodon* f. *curta*. Examples from wet places are small

and short ovoid (f. curta)." (Sterki, Land and Fresh-water Mollusca in the Vicinity of New Philadelphia, etc., p. 5, 1894.)

Bifidaria tappaniana (C. B. Adams). Figs. 42 to 53.

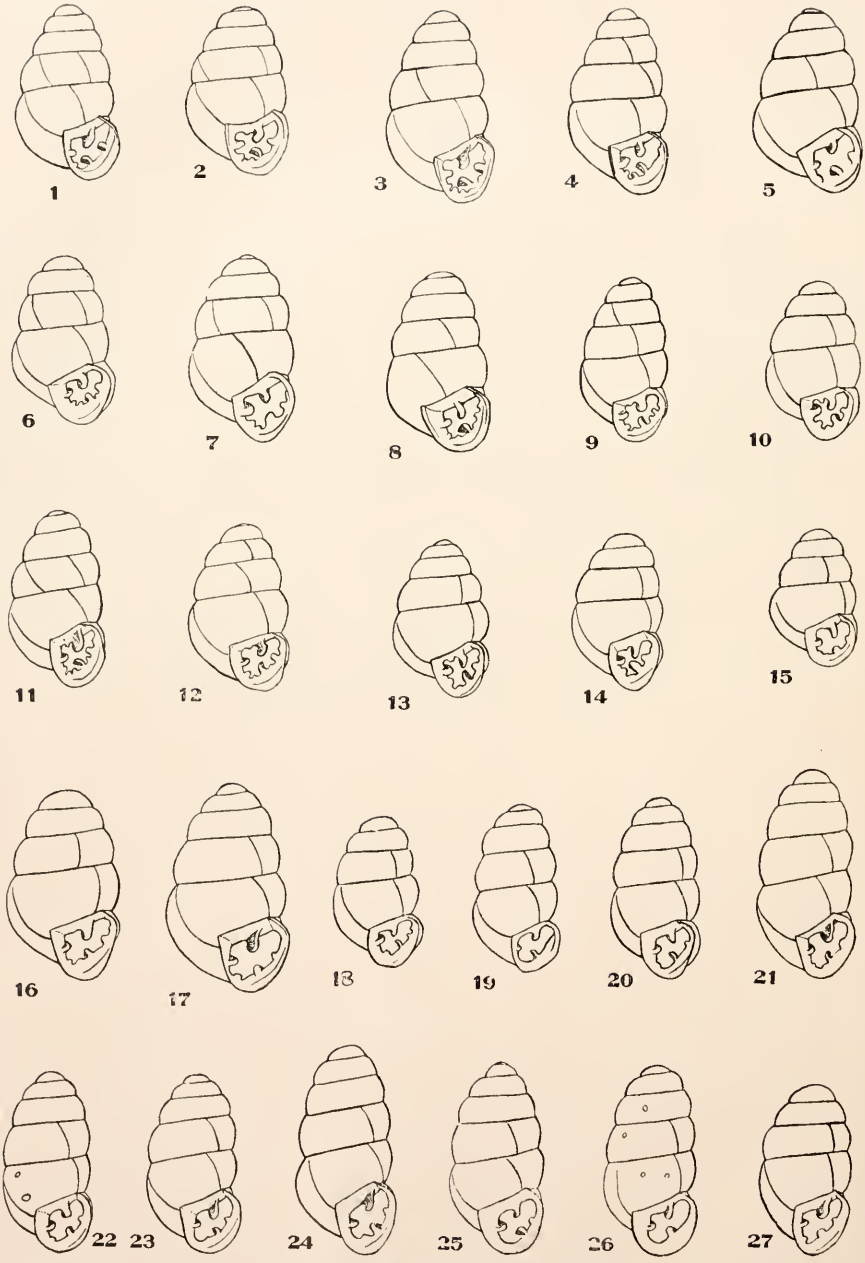
The shell is larger than *pentodon*, markedly conic though obtuse; only one tooth on the parietal wall, usually 6 on the columellar, basal and outer margins, those on the latter standing on a strong rib. Lower palatal tooth usually not so long and entering as in *B. pentodon*.

Distribution, Ontario to the Gulf of Mexico, west to Iowa and Kansas, southwest to Arizona, but not known from the southeastern Atlantic States, Virginia to Florida.

This is the form now everywhere known as "*pentodon* Say." It is often a difficult question, upon which no two experts might agree, whether to refer a certain specimen to *tappaniana* or to some form of *pentodon*, since while the larger size and globose-conic shape are characteristic of *tappaniana*, yet intermediate sizes and shapes occur occasionally, so that we disclaim any intention of setting up a definite boundary between the forms. It can only be claimed that the great majority of lots are quite readily separable. The variations in size and shape are well shown in the figures. Figs. 42, 43, Philadelphia; 44, Buckfield, Me.; 45, Ithaca, N. Y.; 46–48, Duchess Co., N. Y.; 49–52, Washington, D. C.; 53, Oak Creek, Arizona. The original description follows:

"*Pupa tappaniana* Ward, inedit. Shell very small, pale horn-color, translucent, tapering above the penultimate whorl; whorls a little more than five, convex, with a well-impressed suture; aperture sub-orbicular (the penult. whorl cutting off about one-third of the circle), about one-third of the length of the shell; margin sharp, with a narrow contraction in the submargin, beneath which is a thickening within, on which are the labial teeth; teeth eight, five primary and three secondary; of the former the largest is on the penultimate whorl, the next largest on the left side of the aperture; at the base, beginning at the left hand, is a primary, then a secondary, a primary, a secondary, a primary and another secondary, extending nearly to the upper extremity of the right margin; the last three primaries are not constant in size; umbilicus open. Length 0.08 inch; breadth 0.05 inch.

"This species is easily distinguished from the preceding (*P. contracta*) by its teeth." (*C. B. Adams*, History of Vermont, Z. Thompson, 1842, p. 158.)



Bifidaria pentodon. 1–4, 8. Buckfield, Me.; 5. Woodland, Me.; 6. Fairfield, Me.: 7. Westbrook, Me.; 9. Alachua Co., Fla.; 10. Volusia Co., Fla.; 11. San Marcos, Tex.; 12. Comal Co., Tex.; 13, 16, 17. Wetumpka, Ala.: 14, 15, 20. Near Valley Head, Ala.; 18, 19. Woodville, Ala.: 21–27. Wetumpka, Ala.

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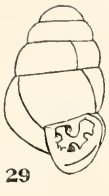
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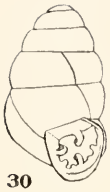
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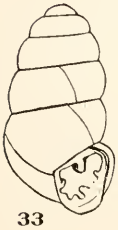
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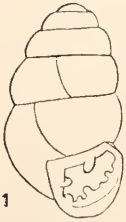
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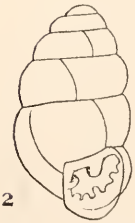
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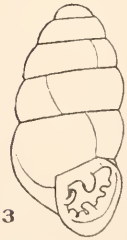
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Bifidaria pentodon. 28, 29. Troy, N. Y.; 30 Greenwich, N. Y.; 31, 37. Henry Co. Ind.; 32. Ocean City, N. J.; 33. Des Moines, Ia.; 34, 35. New Philadelphia, O.; 36. Cincinnati, O.; 38. Miami, Fla.; 39. Des Moines, Ia.; 40 Jasper Co., Mo.; 41. Silver Lake, Kans.

Bifidaria tappaniana. 42, 43. Philadelphia, Pa.; 44. Buckfield, Me.; 45. Ithaca, N. Y.; 46–48. Duchess Co., N. Y.; 49–52. Washington, D. C.; 53. Oak Creek, Ariz.

It is not known whether this description was published before or after the following, both appearing in 1842. This is the comparatively large shell commonly known as *P. pentodon*, and figured as such in Binney's *Manual*.

"*Pupa tappiana* (Ward) Pfr. * * * conical-ovate, with 1 strong parietal tooth, 1 columellar, 4 or 5 smäller on outer lip; length 2, diam. $1\frac{1}{4}$ mm. Vermont." (*Pfr.*, Symbolæ ad Hist. Heliceorum, ii (1842), p. 55.)

This may well be considered a synonym of *tappaniana* Ad.

Plate VI.

Bifidaria pentodon (Say).

Figures 1–4. Buckfield, Maine. John A. Allen, Acad. Nat. Sci. No. 87304.

5. Woodland, Maine. O. Nylander. No. 58249.

6. Fairfield, Maine. J. H. Thomson. No. 58248.

7. Westbrook, Maine. A. D. Brown Collec. (Bolles). No. 4263.

8. Buckfield, Maine. John A. Allen. No. 87307.

9. Cotype of *P. floridana* Dall. Alachua Co., Fla. W. H. Dall. No. 58242.

10. Mt. Taylor, S. of Volusia, Volusia Co., Fla. H. A. Pilsbry. No. 72769.

11. Drift of Sinking Spring, San Marcos, Texas. H. A. Pilsbry. No. 90454.

12. Drift of Guadalupe R., 4 m. above New Braunfels, Texas. H. A. Pilsbry. No. 90456.

13. Wetumpka, Alabama. H. H. Smith. No. 87151.

14, 15. Near Valley Head, Alabama. H. H. Smith. No. 90451.

16, 17. Near Wetumpka, Alabama. H. H. Smith. No. 90458,

18, 19. Woodville, Alabama. H. E. Sargent. No. 66901.

20. Big Wills Walley, 2 m. S. of Valley Head, Alabama. H. H. Smith. No. 90453.

21–27. Near Wetumpka, Alabama. H. H. Smith. No. 90425.

Plate VII.

Bifidaria pentodon (Say).

Figures 28, 29. Troy. New York. T. H. Aldrich. A. N. S., No. 58251.

30. Greenwich, New York. T. Bland. No. 3924.

31. Henry Co., Indiana. R. Walton Collec. No. 58240.

32. Ocean City, New Jersey. H. A. Pilsbry. No. 72709.

33. Near Des Moines, Iowa. T. Van Hyning. No. 88439.

34, 35. Near New Philadelphia, Ohio. Dr. V. Sterki. No. 58239.

36. *P. cincinnatiensis* Judge. Cincinnati, Ohio. Wm. Doherty. No. 58244.

37. Henry Co., Indiana. R. Walton Collec. No. 58240.
38. Miami, Florida. S. N. Rhoads. No. 58253.
39. Des Moines, Iowa. T. Van Hyning. No. 79641.
40. Jasper Co., Missouri. M. A. Mitchell. No. 58254.
41. Silver Lake, Kansas. J. B. Quintard. No. 58246.

Bifidaria tappaniana (Ad.).

42. School Lane, Germantown, Philadelphia, Pa. R. Walton. No. 58250.
43. West Fairmount Park, near Chamounix, Philadelphia, Pa. Vanatta. No. 58224.
44. Buckfield, Maine. John A. Allen. No. 58219.
45. Ithaca, New York. No. 62486.
46–48. Upper Red Hook, Duchess Co., New York. W. S. Teator. No. 58218.
49–52. Washington, D. C. E. Lehnert. A. N. S., No. 58225.
53. Drift of Oak Creek, Page's Ranch, Oak Creek, Arizona. E. H. Ashman. No. 82925.

DREDGING IN FRENCHMAN'S BAY, MAINE.

BY DWIGHT BLANEY.

Professor Edward Forbes has said, in speaking of the underwater world, "The difficulties which attend the inquiry add to the zest of the research; and there is a charm in travelling mentally over the hills and valleys buried inaccessibly beneath their thick atmosphere of brine."

There are other pleasures, however, associated with what we call the "adventure" of dredging—as dredging for shells, like many another adventure is full of surprises—and suggests untold possibilities in the way of new discoveries. One never knows what treasures will be in the next haul, and the most discouraging day still leaves us with enthusiasm for the next trip. We indeed believe that it matters little how poor a haul may be: each trip always yields us something of interest. Any day we may come upon a colony of some species we have looked upon as rare—and the next haul the dredge may disclose fine live specimens of species previously found dead.

For several seasons the *Mesalia erosa*, (Couth.) was represented in our collection by a single dead and much eroded specimen, until one lucky day we came upon a colony of them, fine large live ones. The shells were quite crimson in color, and the animals so tenacious

of life as to live for days in salt water, giving us good opportunity to make drawings of them under the microscope.

Another shell which we had looked upon as rare, and whose sculptured whorls we had always admired, is the *Scala grœnlandica* (Perry). Last summer we found it in comparative abundance in one locality. Our boat being out of repair, we made a number of hauls from the ledges, well out toward the sea. One of us would take the dredge out about one hundred yards from shore and drop it, while the others on the rocks would laboriously pull it in. The haul thus radiating from one spot would cover quite an area, varying of course in depth. On this bottom, composed of quantities of fragments of barnacles scraped from the ledges by the ice in previous winters, we found a number of interesting northern species, among which was the *Scala* above mentioned. The barnacle fragments formed a most excellent protective background for this species, and it required sharp eyes to pick them out after the material had been washed over.

Associated with the *Scala* was the *Menestho striatula* (Couth.), which was equally hard to pick out from among the broken shells. As many as thirty specimens of *Scala* would be found in each haul of the dredge, and the *Menestho* proved to be also common here.

Here we also found the *Bela bicarinata* (Couth.) and a great many of the *Cylichna alba* (Brown).

One of the unexpected surprises occurred one day, when in making a haul in deep water, our precious dredge caught in some obstacle which came to the surface with great reluctance. It proved to be a "gang" of lobster traps, which had been carried off into deep water and so lost. It was duly recognized and claimed by one of our men, who had lost it the previous winter. On the stones with which each trap was weighted, we found many specimens of *Chitons;* the *Trachydermon ruber* (Linne), the *T. albus* (Linne), and a few *Tonicella marmorea* (Fabr.), also a number of *Lepeta cæca* (Müller). It is interesting to note, in relation to the last species, that Gould in his "Invertebrata of Massachusetts," 1st edition, 1841, says: "Only three specimens of this shell are yet known." This is repeated in the edition of 1870. We have found it, however, fairly common.

Another surprise in our dredging was to come upon the "Dumping Ground" of the Bar Harbor Refuse Scow. On this spot Bar Harbor has deposited its refuse for some years. The lighter material being carried out by the tide and the heavier sinking to the bottom

to become encrusted with the red nullipore—*Lithothamnion polymorphum*—broken bottles, bones, broken china, and similar refuse forming good hiding-places for many shells. The *Chitons* mentioned above, and the *Solariella obscura* (Couth.), also the pretty *Margarites grœnlandica* (Gmelin) and the *Margarites cinerea* (Couth.) are found at this spot. The past year has seen a renewal of the industry of dredging the great scallops *Pecten magellanicus* (Gmelin). Many natives have fitted good-sized sailboats with power, and with power-dories and large, chain-meshed dredges have given the bottom of the Bay a good scraping. This industry has paid well for a while, but the increasing number of boats devoted to this work is beginning to tell on the supply, and it is bound to give out shortly.

SHELLS OF GRANT, VALENCIA CO., NEW MEXICO.

BY H. A. PILSBRY.

During a brief stop at this place, which is on the Santa Fé Pacific R. R., near the western boundary of New Mexico, above the middle of the Territory, Messrs. Albert and Joshua Baily, Jr., of this city, collected a series of shells, including several forms of considerable interest. The specimens of *Lymnæa bulimoides* are a very globose and short-spired variety, which I have before received from Prof. Cockerell and others. It will be described as var. *cockerelli* in a paper on Southwestern Mollusca now about to be published.

Valvata humeralis is a Mexican species, new to the fauna of the United States, and its occurrence so far north of the Mexican boundary leads us to expect it in suitable places over a considerable territory within our limits. It is quite unlike *V. vireus* of the Rocky Mountain region, having more in common with the northern *V. sincera* Say. The list follows:

Zonitoides arborea (Say).
Z. minuscula (Binn.).
Pyramidula striatella (Anth.).
Helicodiscus parallelus (Say).
Vallonia gracilicosta (Reinh.).
V. cyclophorella (Anc.).
Pupoides marginatus (Say).
P. hordaceus (Gabb.).
Pupilla muscorum (L.).
P. blandi (Morse).
P. syngenes dextroversa (Pils. & Van.).
Bifidaria pellucida hordeacella (Pils.).
Vertigo ovata (Say).
V. coloradoensis arizonensis (Pils. & Van.).
Cochlicopa lubrica (Müll.).
Succinea grosvenori (Lea).
Lymnæa bulimoides cockerelli (Pils.).
Planorbis parvus (Say).
Physa sp. undet., not adult.
Valvata humeralis (Say).

ON A NEW FLORIDIAN CALLIOSTOMA.

BY WILLIAM HEALEY DALL.

In March, 1903, the U. S. Fish Commission steamer Fish Hawk obtained some casts of the dredge in the straits of Florida. This material has recently been turned over to the National Museum, and proves to contain several items of interest. At Station 7511, in 45 fathoms, off Fowey Rocks, was dredged a species of *Calliostoma* which appears to be new; at Station 7516 fragments of *Oniscidia dennisoni* were obtained, with a specimen of *Scala* (*Acrilla*) *retifera* Dall, 28 mm. in length, and at Station 7511 a fine specimen of the rare *Subula floridana* Dall, described originally from the Blake dredgings. As it has been shown that the name *Eutrochus* Adams is preoccupied, I replace it by *Leiotrochus* Conrad, 1863, typified by *L. distans* Conrad, of which the type has turned up in the National Museum (see Trans. Wagner Inst., iii, pp. 399 and 402), and proves to be a mature specimen of the shell named *Trochus conus* by H. C. Lea in 1845. *Astele* Swainson, 1855, seems to be more closely related to *Solariella*, and is described as "with no columella," the inner lip being simple and arcuate. Conrad's diagnosis is incorrect, as the reader will see by referring to the above-mentioned data. His type is smooth, with, in the adult, a narrow, deep umbilicus and a distinct Calliostomoid pillar. Owing to Conrad's contradictory diagnosis of 1863, I hesitated, in 1892, to accept his name, but as things now stand it seems necessary to do it or to propose a new one. The description of the species is as follows:

Calliostoma (Leiotrochus) marionæ n. sp.

Shell acutely conic, with the sides of the spire slightly concave, ten-whorled, brilliantly polished, color a rich brick-red, mottled near the periphery with whitish flammules; nucleus translucent white, tilted obliquely; sculpture, on the subsequent four or five whorls, of five (5) granular, spiral ridges, separated only by narrow incised lines, with a more conspicuous ridge just above the suture; subsequently the ridges become flattened, wider and more or less spirally striate on their tops, while the original five incised lines retain a darker color than the rest of the surface; the suture is not strongly marked, and runs just below the periphery of the preceding whorl; base slightly convex, with ten or eleven similar incised spiral lines

stronger toward the umbilicus, where the interspaces become feebly nodulous, the last one on the brink of the umbilicus more strongly so; umbilicus moderately large, funicular, its walls white, smooth, and slightly excavated just within the basal margin; pillar white, thin, arcuate, ending in a blunt projection separated by a small notch from the basal margin of the aperture, which, with the outer lip, is thin and sharp; throat pearly, without lirations or callus on the body. Alt. of shell 19.0, max. diam. 18.0; diam. of umbilicus 2.5, min. diam. of base 16.0 mm.

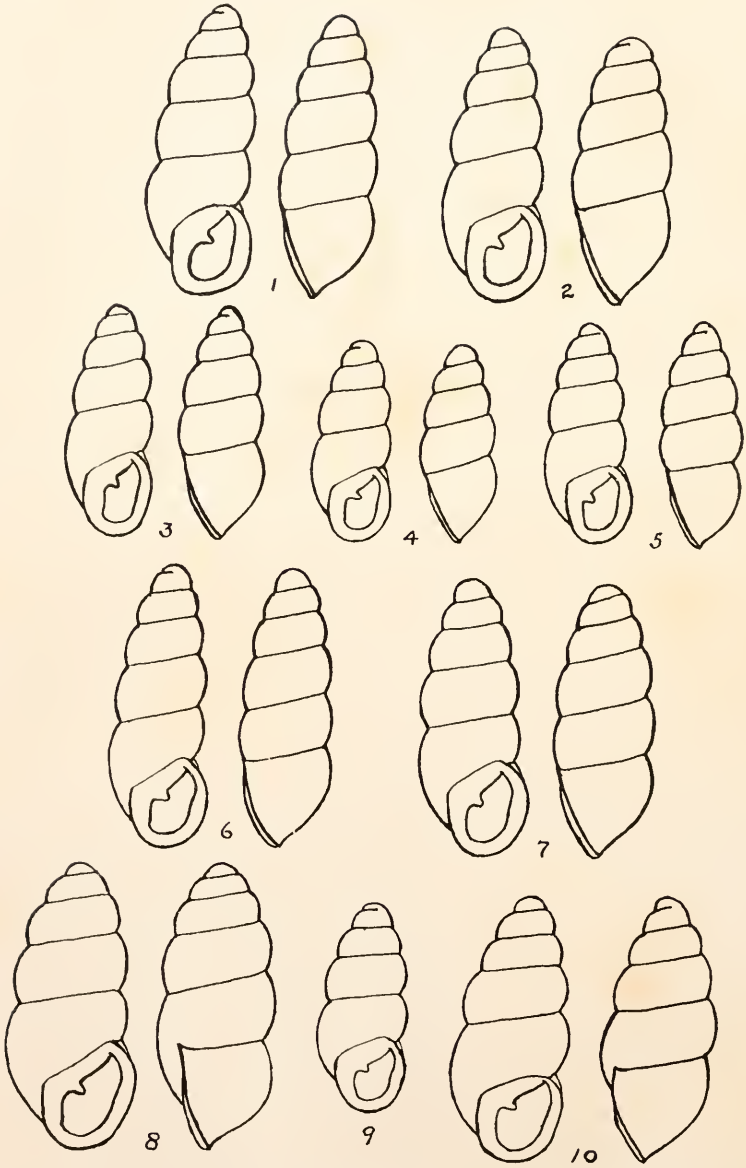
The periphery is subangulate, becoming rounded in the adult. The operculum is thin, horny, multi-spiral, with about 14 whorls. The animal is of a reddish color somewhat like the shell, the sides of the foot granular, the muzzle concentrically wrinkled, the tentacles long and slender, with no epicephalic veil between them; the eyes large and black, on short but distinct peduncles, behind and above the tentacles; epipodial lobes with papillose edges and two or three more elongate processes on each side, but none project from the opercular lobe; the foot is short and rather blunt behind. As contracted from immersion in alcohol, the tentacles and epipodial processes seem smooth, and show no such ciliation as is figured by Adams in *Calliostoma*, while the absence of the "veil" is noteworthy.

Altogether, though not very large, this is one of the most attractive East American species, both in form and coloration. Only one specimen has yet been obtained, No. 187233, U. S. Nat. Mus. register.

Note on Trivia acutidentata Gask.—A few years ago, among a few shells obtained by me in San Francisco on board a schooner direct from the Galapagos Islands, I found one beach-worn *Trivia* which puzzled me, as it differed widely from any species then known to me. Upon a recent careful reading of the original description of *Trivia acutidentata* Gask., I find that this specimen corresponds exactly to Gaskoin's description.

This species, thus far unfigured, was described (Proc. Z. S., 1835, p. 201) from a single worn specimen collected by Cuming in the Bay of Guayaquil, and which, after description, was broken into unrecognizable fragments. As the locality of my specimen is also substantially the same, it would seem that this long-lost species has at this late day been again found.—Fred L. Button.

Feeding Habits and Growth of Venus mercenaria. By Jas. L. Kellogg (N. Y. State Museum, Bull. 71). A very interesting and instructive paper illustrated by four plates.—C. W. J.



Figs. 1, 2, 6, 7. Carychium exile canadense.
Figs. 8, 9. Carychium exiguum.

Figs. 3, 4, 5. Carychium exile.
Fig. 10. C. stygium.

THE NAUTILUS.

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NOTE ON A NEW VARIETY OF CERITHIDEA SACRATA GLD., FROM SAN DIEGO, CAL.

BY S. S. BERRY.

There is present in several Californian collections, and also in the National Museum and elsewhere, a form of the common *Cerithidea sacrata* Gould, which is "peculiar in appearance, and might be none the worse for a mutational name" (*Dall*). It differs from the ordinary form, with which it intergrades, by being smooth, or nearly so, and more tapering, as shown in the accompanying figure. It is quite heavy and solid, and in my specimens the callus of the aperture is of a lighter and browner tint than is usual, and the aperture is smaller and less inflated. Length 30 mm. The original *C. sacrata* was pretty smooth, but for convenience in designating this form, especially as opposed to the heavily ribbed var. *pullata* Gould, the name *hyporhyssa* is here suggested. All the specimens seen are from San Diego, although it doubtless occurs elsewhere.

Stanford University, Feb. 10, 1906.

ADDITIONAL NOTES ON BIFIDARIA PENTODON AND B. TAPPANIANA.

BY V. STERKI.

We are indebted to Messrs. Vanatta and Pilsbry for their *exposé* of these species and their forms, in the March NAUTILUS. The essence of it is that what we called *B. pentodon* Say is really *tappaniana* Ad., and the forms ranged under *curvidens* are *pentodon* Say.

After once more looking over part of my materials[1] and the critical forms, I find occasion for a few notes which it may be permitted to add.

The form *curta* does not belong to *pentodon*,[2] but to *tappaniana*. In some places it has almost the significance of a variety. The shells of *pentodon* from wet situations are usually also more ventricose, ovoid, than those from more elevated and comparatively dry stations.

Fresh, good shells of *pentodon* from many places are glassy, transparent, colorless, while others are of a horny or milky hue; those of *tappaniana* are more generally so. *B. pentodon* from some places has no callus or a very slight one in the palate.

The "parietal" lamella in both species and all forms is really composite,[3] *i. e.*, composed of the parietal and angular, although the latter is generally quite small, a mere appendage of the former, especially in *tappaniana*, while in many specimens of *pentodon* it is quite distinct, and in some the whole lamella is even bifid, somewhat like that of *B. holzingeri*.

The habits of the two species are rather different, and they are not often found associated. Thus *B. pentodon* is common among moss and grass in forest and on open slopes, even steep, stony and rocky hillsides, where *tappaniana* is hardly ever found. The latter is prevalent in low, damp places, under wood, etc.

One feature of interest may be mentioned here. Like those of

[1] About 250 entries on the two species.

[2] The names in the following are used in the sense of Vanatta and Pilsbry in the article referred to.

[3] *Conf.* Pilsbry and Vanatta, A Partial Revision of the Pupae of the United States, Proc. Acad. Nat. Sc., Phila., 1900, p. 593, key (*Vertigopsis*). In some figures on the plates VI and VII in the NAUTILUS, the angular is shown, *e. g.*, Figs. 3, 12, 21, 27, 32.

B. armifera and *contracta*, the shells of many specimens, especially of *pentodon*, are covered with mucus and dirt, often completely, and frequently forming a somewhat irregular ridge along the middle of the whorls. This is not accidental, but evidently done by the animal on purpose, probably for additional protection against drought.

DESCRIPTION OF NEW SPECIES OF ACHATINELLIDAE FROM THE HAWAIIAN ISLANDS.

BY D. D. BALDWIN.

Partulina cooperi, n. sp.

Shell dextral, very minutely perforated, rather thin, acuminately ovate conic, apex acute; surface shining, striated with fine growth-lines and under a strong lens exhibiting very close and minute decussating spiral striæ, which extend to the apex. Color light yellowish-brown, sometimes dark reddish-brown, variously banded; the constant characters being a white band at the periphery, a black line traversing the suture, with two white lines one above and one below the suture, all three lines extending to the tip of the apex. Whorls 6, somewhat convex, narrowly margined above, suture well impressed. Aperture oblique, oval, white within. Peristome brown, acute, slightly, thickened within, basal and columellar margins narrowly reflexed. Columella terminating in a strong, flexuous tubercle, tinged with reddish-brown.

Length, 17; diam. $9\frac{1}{2}$ mm.

Hana, East Maui.

Named in honor of Mr. G. O. Cooper of Hana, to whom we are indebted for the discovery of both this and the following species.

Partulina fulvicans, n. sp.

Shell dextral or sinistral, very minutely perforated, rather thin, acuminately ovate conic, apex subacute; surface shining, marked with delicate incremental striæ, nuder a lens exhibiting extremely close, minute decussating spiral striæ; unclear whorls faintly cross-lined. Color very light yellow, or sometimes white with one or two light yellowish transverse lines; a conspicuous dark band near the apex. Whorls 6, somewhat convex, narrowly margined above;

suture well impressed. Aperture oblique, oval, white within. Peristome acute, slightly thickened within, columellar margin narrowly reflexed. Columella terminating in a strong, white, flexuous fold.

Length, 18½; diam. 10½ mm.

Habitat, Kipahulu valley, Hana, East Maui.

The sinistral variety may prove to be a distinct species.

The molluscan life of this rather secluded valley has only recently been explored.

Newcombia carinella, n. sp.

Shell dextral, very minutely perforated, solid, acuminately turrited, apex subacute; surface lusterless, rather coarsely and irregularly wrinkled by growth striæ, and covered with numerous rather prominent decussating spiral striæ which extend to the apex, with a cord-like carination at the periphery. Color white and brown, alternating in irregular longitudinal undulations, upper whorls with regular white and brown tessellations; apex light brown. Whorls 6, slightly convex; suture lightly impressed; the suture of second and third whorls are margined by the continuation of the peripheral keel or cord. Aperture oblique, oval, livid-white or light-brown within. Peristome light-brown, acute, very lightly thickened within, columellar margin reflexed over the small perforation. Columella very slightly developed, plain and smooth.

Length, 15; diam., 6½ mm.

Habitat, Nahiku, East Maui.

Amastra montana, n. sp.

Shell dextral, imperforate, rather thin, ovately conical, apex acute; surface lustreless, sculptured with fine incremental lines; the nuclear whorls finely radiately sulcated. Color light-brown, covered with a dark fugacious epidermis. Whorls 6, the upper ones slightly convex, the last one somewhat inflated, forming the larger part of the shell. Aperture a little oblique, elongately oval, white within. Peristome simple and thin. Columella terminating in a thin, arched, lamellar plait.

Lenth, 14; diam., 9½ mm.

Habitat, Mt. Kukui, summit of West Maui, 6,000 ft. alt.

Animal in motion as long as the shell. Mantle dark-brown with a light-brown border. Foot and tentacles almost black. Head above coarsely granulated.

This species was found in company with *Laminella alexandri*, Newc. at an altitude incongenial to most Achatinellidæ species.

Amastra rubristoma, n. sp.

Shell dextral, imperforate, solid, elongately ovate-conic, apex acute; surface striated with irregular growth striæ; nuclear whorls radiately sulcated. Color reddish-brown, sometimes almost white, upper whorls darker; generally covered with a dark fugacious epidermis. Whorls 7, convex, suture well impressed. Aperture a little oblique, oval, red within, sometimes livid-white. Peristome acute, very slightly thickened within. Columella terminating in a strong arched lamellar plait, tinged with red.

Length, 19½; diam., 12 mm.

Habitat, Island of Lanai.

This species was discovered by Mr. D. Thaanum of Hilo, Hawaii, who has done much to encourage the study of Hawaiian land fauna.

Amastra seminuda, n. sp.

Shell dextral, imperforate, solid, ovate, spire convexly conical, apex acute; surface covered with rather irregular growth striæ, the embryonic whorls finely radiately sulcated. Color white or light-brown, lower half of body-whorl covered with a densely black epidermis, rest of the shell destitute of epidermis. Whorls 5, slightly convex, suture moderately impressed. Aperture a little oblique, sublunate, white within. Peristome acute, thickened within, not reflexed. Columella terminating in a broad, thin, arched, lamellar plait.

Length, 14; diam., 9 mm.

Habitat, Waikolu, Is. of Molokai.

Amastra conica, n. sp.

Shell fossil, dextral, minutely perforated, thin, elongately conical, apex acute; surface sculptured with fine growth lines, apical whorls radiately sulcated. Color of living shell unknown. Whorls 7, convex; suture well impressed. Aperture oblique, oval. Peristome simple, very thin. Columella terminating in a slightly developed fold.

Length, 15½; diam., 8 mm.

Habitat, Hamakua, Island of Hawaii.

This and the following species were discovered by Prof. H. W. Henshaw of Washington, D. C. He found them in deposits of fossilized shells at a place called Mana. The existence of living examples of either of these species now, or within any recent period, is highly improbable.

Amastra (*Laminella*) *sinistrorsa*, n. sp.

Shell fossil, sinistral, imperforate, thin, acuminately turrited, spire conical; apex subacute; surface sculptured with delicate growth lines, embryonic whorls radiately sulcated. Color of living shell unknown. Whorls 6, convex, suture well impressed. Aperture oblique, sinuately oval. Peristome simple, very thin. Columella terminating in a slightly developed lamellar plait.

Length, 14½; diam., 6½ mm.

Habitat, Hamakua, Island of Hawaii.

Amastra (*Laminella*) *læva*, n. sp.

Shell sinistral, imperforate, rather thin, conically turrited, apex acute; surface striated with fine incremental lines, embryonic whorls with delicate radiating sulcations, color brown, with irregular patches of a dark fugacious epidermis. Whorls 6, somewhat convex; suture well impressed. Aperture oblique, oval, livid-white within. Peristome simple and thin. Columella terminating in a thin lamellar plait.

Length, 12; diam., 5 mm.

Habitat, Haleakala Mt., East Maui.

This species is the counterpart of *Laminella soror*, Nc. found on West Maui, but the latter is a larger and more obese shell.

NOTES ON CARYCHIUM AND DESCRIPTION OF A NEW VARIETY.

BY GEO. H. CLAPP.

In examining a series of *Carychium* recently, I noticed that there is a large northern race of *C. exile* Lea which is found from Maine to Winnipeg, Manitoba, the latter being the most western point from which I have material. It differs from typical *exile* by its greater size, which is very constant throughout its range. Topotypes of *C. exile* from Wissahickon Creek, Philadelphia, Pa., kindly loaned me

for examination by Dr. H. A. Pilsbry, measure 1.70 x .6 mm., and the lot from Kent, O., from which Dr. Pilsbry defined this species, NAUTILUS, Vol. VIII, p. 63, measure 1.75 x .6 mm.

The average size of *C. exile* from a large series of measurements may be put down as 1.75 x .6 mm.

The northern race is, so far as I have seen, confined to the so-called "Canadian Zone," and I therefore propose the name *C. exile canadense* for this variety, taking shells collected at Kennebunkport, Me., as the types. These measure 2.1 x .75 mm., which is about the average size. The series of measurements below show the slight variation in this variety :

Kennebunkport, Me. (types), 2.1 x .75 mm.
Islesboro, Me., 2.15 x .75 mm.
Aroostook Co., Me., 2.00 x .75 mm.
Hartland, Vt., 2.0 to 2.10 mm. long.
Bobcaygeon, Ont., Can., 2.00 x .70 mm.
Ottawa, Ont., Can., 2.10 x .65 mm.
Winnipeg, Manitoba, 2.05 x .75 mm.
Huron Mtn., Marquette Co., Mich., 2.05 x .75.
Lime Id., Chippewa Co., Mich., 2.0 to 2.1 mm. long.
Gogebic Lake, Ontanogen Co., Mich., 2.0 to 2.1 mm. long.
White Earth Lake, Minn., 2.1 mm. long.
The Ottawa shells are the most slender that I have seen.

All of the Michigan *C. exile* in the collection of Mr. Bryant Walker are var. *canadense* with the exception of one lot from Shelby, Macomb Co., which measures 1.75 to 1.80 mm., and a lot from Saginaw where they run from 1.7 to 1.9 mm.

The only southern shells which I have seen approaching var. *canadense* in size is a lot collected by Herbert H. Smith in mountain forests near Princeton, Ala. These measure 1.90 x .70 mm., and are unusually heavily ribbed, but other shells collected in the same general locality are typical *exile*.

Plate VIII, where the figures are magnified 18 diameters, shows the difference in size very plainly.

C. exiguum also appears to run somewhat larger in the North, but as there is more variation in this species than in *exile*, the northern race is not well defined. The average size of *exiguum* is about 1.75 x .75 mm., but there is a wide variation as shown by measurements given below :

Valley Head, Ala., 1.55 x .65 mm.
Lemon City, Fla., 1.60 x .70 mm.
Staten Island, N. Y., 1.65 x .75 mm.
Edgeworth, Pa., 1.70 x .75 mm.
Des Moines, Iowa, 1.85 x .75 mm.
Iowa City, Iowa, 1.80 x .70 mm.
Crooked Lake, Emmet Co., Mich., 1.75 to 1.85 mm.
Kennebunkport, Me., 1.85 x .80 mm.
Pigeon Lake, Ont., Can., 1.90 x .80 mm.
Orono, Me., 1.80 to 1.90 mm.
Ann Arbor, Mich., 1.65 to 2.00 mm.
Huron Mtn., Marquette Co., Mich., 2.15 x .85 mm.

These figures seem to indicate an increase in size in the north, but the Ann Arbor lot shows almost as much variation as in the balance of the range. The Huron Mountain shells are unusually large, much larger in fact than any others seen from Michigan, and their size is probably due to favorable environment as in other parts of the state typical shells are found.

EXPLANATION OF PLATE VIII.

Fig. 1. Carychium exile canadense n. v., Kennebunkport, Me., 2.1 x .75 mm.

Fig. 2. Carychium exile canadense n. v., Winnipeg, Manitoba, 2.05 x .75 mm.

Fig. 3. Carychium exile Lea, topotype, Wissahickon Cr., Phila., Pa., 1.70 x .60 mm.

Fig. 4. Carychium exile Lea, Mt. Vernon, Va., 1.50 x .55 mm.

Fig. 5. Carychium exile Lea, Edgeworth, Pa., 1.75 x .60 mm.

Fig. 6. Carychium exile canadense n. v., Ottawa, Ont., Can., 2.10 x .65 mm.

Fig. 7. Carychium exile canadense n. v., Huron Mtn., Marquette Co., Mich., 2.05 x .75 mm.

Fig. 8. Carychium exiguum Say, Huron Mtn., Marquette Co., Mich., 2.15 x .85 mm.

Fig. 9. Carychium exiguum Say, Valley Head, Ala., 1.55x.65 mm.

Fig. 10. Carychium stygium Call, cotype, Mammoth Cave, Ky., 2.00 x .85 mm.

A NEW SUBSPECIES OF POLYGYRA MULTILINEATA SAY.

BY WM. A. NASON.

Polygyra multilineata algonquinensis n. subsp.

The shell is smaller than *multilineata*, color varying from white translucent to dark horn or chestnut, banded with reddish brown or unicolorous, rather thin and fragile, peristome moderately reflected, white.

Greater diameter 17 mm., 32 specimens.
Greater diameter 17.5 mm., 24 specimens.
Greater diameter 18 mm., 72 specimens.
Greater diameter 18.5 mm., 41 specimens.
Greater diameter 19 mm., 54 specimens.

Algonquin, McHenry Co., Illinois.

Cotypes in collections of Bryant Walker, Acad. Nat. Sci. Phila., Chicago Academy of Sciences, and Arthur F. Gray.

All the specimens collected were examined, 284 in number, and their average size is expressed in the above table of measurements. The largest specimens found were three which measured 21 mm. in greater diameter, and the two smallest specimens only measured 14.50 mm. in greater diameter. No larger specimens than those mentioned were found in the region, although the ground was well explored for many years.

The specimens were all found in crevices and hollows about the roots of a clump of willows, growing in a marshy and boggy place. Associated with them were numerous specimens of *Polygyra monodon* Rack., *Succinea ovalis* Say, *Pomatiopsis lapidaria* Say, *Pyramidula striatella* Anth., and other moisture-loving land shells.

A comparison made with 48 specimens of *P. multilineata* from Ohio, Michigan, and other localities, in my collection, showed great difference in measurements. 33 specimens of this series measured 22 mm. to 24 mm. in greater diameter, and only two specimens were as small as 21 mm. in diameter.

The uniformity of size of the variety *algonquinensis*, the fact that no other forms or sizes of the species were found in this region, and the fact that they breed true, for the series was the result of three years' collecting on the same small space of ground, entitles this shell to varietal rank. And also, the perfect development of all the characters, as found in the normal *P. multilineata*, and the fact that this

new subspecies is not in any way pathological, confirms the claim. The smallest forms mentioned above are as well characterized and symmetrical as the largest forms.

An interesting fact in regard to the specific value of the bands in this variety is exhibited by two or three specimens. In these the shell is unicolorous until half-grown, and banded from that point to the reflected lip. And one specimen is the reverse in this respect, being banded when young, and later in its growth unicolorous. This would seem to indicate that the bands and color are not even a stable individual character.

LYMNAEA HINKLEYI N. SP.

BY FRANK COLLINS BAKER.

Shell varying from ovate to globose, very thin; color of periostracum light greenish-horn; surface dull to slightly shining, rough, the growth lines uneven and raised at intervals to form pseudo ribs; the surface is sometimes malleated and occasionally ornamented by five or six heavy spiral ridges; fine spiral, impressed lines present and very marked in some specimens; whorls 3 + (the apex invariably decollated), rounded, tumid in some specimens, the last whorl globose; spire of variable length but generally shorter than the aperture, broadly conic; sutures distinctly appressed and frequently distinctly impressed; aperture roundly ovate, not expanded, acutely narrowed at the posterior angle; outer lip thin, acute; inner lip very tightly appressed to the parietal wall, where it shows as a very thin wash of callus; the anterior part of the inner lip is reflected over the umbilicus, leaving a very small chink; axis slightly twisted, forming a distinct ascending plait.

Length 12, breadth 8.5, aperture length 8, breadth 5 mm.

Length 11.5, breadth 7.5, aperture length 7.25, breadth 4.5 mm.

Length 12, breadth 7.75, aperture length 7, breadth 4 mm.

Length 11, breadth 6.75, aperture length 6.25, breadth 3.75 mm.

Length 15.25, breadth 9.25, aperture length 10.5, breadth 5.5 mm.

Length 11, breadth 6.75, aperture length, 6.5, breadth 3.75 mm.

North fork Snake River, East Idaho. Collected by Mr. A. A. Hinkley in 1905. Types: Chicago Academy of Sciences; cotypes: Academy of Natural Sciences of Philadelphia, and Mr. A. A. Hinkley.

This is apparently a very distinct species and does not appear to be exactly comparable with any *Lymnæa*. It was thought to be *L. binneyi*, but the shell is very much smaller and thinner, with no umbilicus and without the acute spire of *binneyi*. It apparently belongs to the typical group of *Lymnæa* despite its globose shape, which might place it in *Radix*, excepting for the lack of the raised and continuous lips of the aperture. It has something of the aspect of a young *Bulimnea*.

I take great pleasure in naming this species in honor of Mr. A. A. Hinkley, of Du Bois, Illinois, in whose collection the shells were found.

NOTES.

NOTE ON SOME NAMES IN THE VOLUTIDÆ.—A revision in which I have been engaged for some time of the nomenclature and classification of the *Volutidæ*, has shown several errors which have attained a wide currency owing to the failure of authors to attend to the details of early publications on the subject. This has rendered it necessary to give new names to several groups, and to shift some names to groups agreeing with their original types, which had been neglected or lost sight of. Some of the more conspicuous instances are as follows:

Adelomelon Dall; new name for the dull-colored group of South American volutes usually called *Scaphella*, but not the *Scaphella* of Swainson, 1832. Type, *Voluta ancilla* Solander.

Harpulina Dall; new name for *Harpula* auct. non Swainson, 1832. Type, *Voluta arausaica* Solander, 1786.

Maculopeplum Dall; Type, *Voluta junonia*, Lamarck. This was originally included with the species of *Scaphella* by Swainson, whose type was *Scaphella undulata* Lam., but the American shell belongs to a totally different group from the enamelled species for which Swainson's genus was proposed. *Amoria* Gray, is probably a synonym of *Scaphella*.

Volutilithes Swainson, was proposed for the shells to which Fischer later gave the name of *Eopsephæa*. The type is *Voluta muricina* Lam. The shells typified by *Voluta spinosa*, and which are usually called *Volutilithes*, will probably take the name of *Plejona* Bolten, 1798.

When discussing the *Volutidæ* in the Wagner Inst. Transactions in 1890, I stated that I had not attempted to revise the nomenclature of the group at that time; but if I had been aware of the serious reformation needed in the accepted nomenclature, I should have felt obliged to undertake it without delay.—Wm. H. Dall.

PUBLICATIONS RECEIVED.

Loess Papers: The Loess of Nachez, Mississippi; The Loess and the Lansing Man; Loess and the Iowan Drift; Evidences (?) of Water-deposition of Loess. By B. Shimek (*Bull. Lab. Nat. Hist. Iowa State University*, V., no. 4). The question of the genesis of the loess of the Mississippi Valley has interested two generations of geologists. Until quite recently the great majority of American writers, and among them Prof. Shimek himself, ascribed its deposition to the action of water. Later studies by Shimek, covering exposures over practically the whole loess area, caused him to advocate the view that our loess is of Æolian origin. This thesis is discussed with great ability, and it is not possible here to give an adequate outline of the argument. It is shown that the highest and thickest deposits of loess lie along the larger streams, and their deposition by water would require vast inland lakes, of which there are no traces of shore-lines. The fine and homogeneous deposits containing fragile shells unbroken and unworn, are not such as would be deposited by aqueous action. Moreover, fluviatile shells are absent, the loess fossils being chiefly land shells, and exceptionally those of small pools. A great mass of evidence, geological and faunal, is brought forward to show that the loess is of the nature of an upland dune formation.

The argument for æolian origin from the fossil shells will be read with great interest by conchologists. Prof. Shimek's thorough knowledge of both the loess and the modern faunas enables him to deal hard blows to those who attempt to defend the aqueous theory on palæontologic grounds. The last essay of the series is a damaging critique of the papers of Prof. G. Frederick Wright and Luella A. Owen. There are fourteen excellent plates, two representing fossil land shells of the Nachez loess.

This brochure contains the most complete and authoritative exposition of the subject of loess formation in the English language, and will be invaluable to all students of the loess and its fossils.—H. A. P.

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